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Original Articles

Uterine Polyps

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A uterine polyp has ever been one of the most dramatic and interesting affections in gynecology. I need not apologize, therefore, for introducing polyps once more to the profession, for I feel also a strong conviction that old subjects need reviewing now and then, that we may carry on that continual reëducation of the profession which is necessary in the vast field of modern medicine.

The immediate occasion of this writing was the appearance in my clinic of a remarkable polyp. Let me describe it: Miss P., aged thirty-nine, came to me in November, 1920, pretty well exsanguinated and complaining of a more or less constant bloody flow. Her general previous history was unimportant; she had menstruated at sixteen and was regular with no pain up to the present illness. Four years before a uterine hemorrhage had lasted for a couple of months; then in August, 1920, a profuse period lasted for three weeks, and was followed by a leucorrhea and a serous blood-stained discharge. When I saw her in November she had been flowing for six weeks excepting four days. An examination at once revealed the source of the trouble lying obviously right on the vulvar orifice, where there was a livid piece of flesh (see Fig. 1) 48 mm. long and 18 mm. wide in the cleft of the labia, soft and flaccid, ending in an attenuated pedicle 10 cm. long, which extended the entire length of the vagina and was attached to the cervix. The length of the whole growth, tumor and pedicle, was 16 cm. (Fig. 2). There was a fissure on the outer surface of the tumor, extending far into the tumor and lined with mucosa. The uterus itself was normal except for a retroflexion, and there was no lateral pelvic disease, so that the patient's whole disability quite certainly lay literally open and exposed to view.

The simple operation consisted in the ligation of the long thin pedicle on the left side of the cervix. Relief was immediate, and there has not been any return of the hemorrhages. The microphotograph shows clearly the benign nature of the growth (Fig. 3).

POLYPS IN GENERAL.

I use the term polyp in its general clinical and historic sense and not in an anatomico-pathological sense, to include all pedunculate mucous or fibrous tumors springing from the uterus or cervix, and covered with mucous membrane. They arise either from the mucosa of the uterus or of the cervix, or from the deeper layers of the uterus when they are fibrous or muscular. They vary greatly in size. The tumor shown in the photograph is large for a mucous

growth; its exceptional size is without doubt due to the fact that it is an aberrant form springing from the vaginal surface of the cervix. Sometimes a flattened mucous tumor some 3 cm. in length is found in the uterine cavity, especially when the uterus is occupied by large fibroid tumors. As a rule, however, mucous or soft (Osiander) polyps are much smaller. The habitat of these mucous growths by predilection is some part of the cervical canal, where they form pedunculate deep red masses as big as a small pea or a raspberry, which bleed

FIG. 1.—The large cervical mucous polyp hanging out of the vaginal orifice.

freely. Fibrous tumors on the other hand may attain a large size, even as big as a fist or much larger; an average size is that of an egg.

The mucous polyps are usually single, or at the most there are two. The fibrous polyp, while it is almost always single, is often but an outpost of a group of similar tumors in the body of the uterus. This is a matter of practical importance, for the discovery of one must lead to a search for others—that is to say, for a general myomatosis. Two things should also be borne in mind, namely, that a polyp may show a beginning adenocarcinoma; this is a rare find, but its importance is obvious. The other thing is the liability of mistaking a so-called "polypoid endometritis" for a polyp. In the first place the term polypoid endometritis is a misnomer, for it is never an inflammatory condition; and in the second place it has nothing whatever to do with polypi. The differentiation is made by noting the abundance of material coming from the polypoid endometrium, while the true polyp is single, elongate, and smooth.

Another practical clinical grouping of polypi is into those which can be readily seen either at the vulvar orifice or in the vagina, and those which are concealed within the uterus. A polyp exposed to view readily indicates the source of a hemorrhage, but when the blood issues from the uterus and the cause of the hemorrhage is not obvious, there may be a number of possible explanations for the loss, many of them more likely than an intrauterine polyp, which is relatively rare.

A curious and still more rare form is the intermittent polyp which comes down into the cervix, becomes visible at the menstrual period, and then retires to invisibility within the uterine cavity again.

A brief review of the history of polyps is instructive, in that it recalls the difficulties under which our predecessors labored, and warns us not to repeat their errors, while filling us with a due sense of thankfulness for the advances made within the past half century. May I not interpolate that he who finds no time to feel and express his gratitude for our splendid acquisitions through the labors of our immediate predecessors, does not deserve to participate in the benefits inherited?

Polyps were well known to the ancients, who on occasion tied them off and removed the easier ones. Our active modern interest, however, began with the great French obstetrician Levret (1703-1780), the deviser of the well-known French lock, and who put the pelvic curve on the forceps, and who also pointed out the proper occasions for the use of the instrument. His book on

polyps appeared in 1749, and here his boldest attempt was to invent a forceps to enable him to throw a wax ligature around the pedicle of an intrauterine polyp. He applied a succession of ligatures as the first ones cut through the pedicle, until a large tumor sloughed and came away in a foul mass; injections of spirits of wine were used to sweeten the discharges. Levret wrote vividly and taught the leading young men of his century, his successors, and the interest awakened at this time never died out until all the problems connected with the subject were settled. We must remember that Levret worked without such excellent skilled coöperation of refined instrument makers as we can secure in our day, without an anesthetic, and without any satisfactory exposure of the field, and in constant dread of a fatal hemorrhage or of death from sepsis.

It was a far cry, almost a century, from Levret to Marion Sims, and in the meantime we find men resorting to a variety of expedients. Naturally in a condition so difficult and so dangerous to meddle with actively, medical means were constantly exploited; chief among these we find iron and ergot. Inasmuch as ergot was an "oxytoxic" it was reasonable to assume that it would also promote the expulsion of a polyp from the non-pregnant uterus, and under this vain assumption our forefathers gave tons of ergot, just as they gave all manner of pepsins by the ton to cure "dyspepsia." Much ingenuity was also spent in devising better means for slipping a ligature over the pedicle inside the uterus. The most important invention, however, and one which really did advance the methods of treatment, was the slow application of a linear crushing force by an instrument invented by the brilliant surgeon Charles Chassaignac, whose beneficent activities were crowded into the two decades in the middle of the last century. Chassaignac's écraseur, a powerful flexible chain-saw made of links, like a thin bicycle chain, was used extensively when I began practice in the early eighties, and I had one in my own armamentarium. The chain, thrown like a loop of a ligature around the pedicle, was then shortened by a screw device until it cut slowly through the pedicle; usually without hemorrhage. The immense advantage of such a means of controlling a hemorrhage up in the uterus and out of sight at that early date is at once apparent. A great impetus was thus given by this invention both here and in many other fields of surgery. A more manageable means than the flaccid chains of embracing the

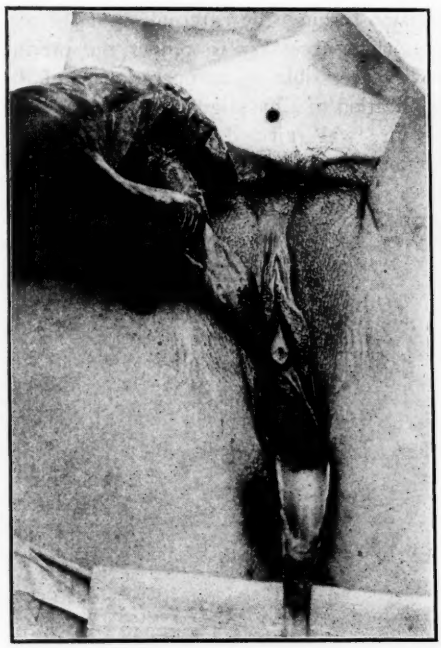

FIG. 2.—Shows the pedicle of the polyp attached to the cervix.

pedicle was soon found in a strong piano wire, which I also used in common with my contemporaries.

In the middle of the last century excision with scissors was also revived, being advocated by a no less eminent surgeon than Sir James Y. Simpson; occasional sharp hemorrhage was controlled by a tight pack.

The three great S's—Sims, Simpson, and Simon — hailing from America, Great Britain, and Germany respectively, at about the middle of the last century gave an unprecedented impetus to gynecology; in fact they may be said to have created the special-

ty. Sims's "Uterine Surgery," appearing in the sixties soon after the war, had a wide influence; in it we find ten pictures of polypi in all possible positions from cervix to fundus, and it is easy to see how the great surgeon revelled in the brilliant cures brought by his skill to these hopeless invalids.

The great advance in Sims's time was due to these several factors: the use of the sponge tent to open up and expose to touch the interior of the uterus; the use of an incision through the external os of the cervix when necessary to render the uterine cavity accessible to an operation; and the application of Chassaignac's écraseur. The ligature was rejected in simpler cases for torsion or excision with scissors. This was

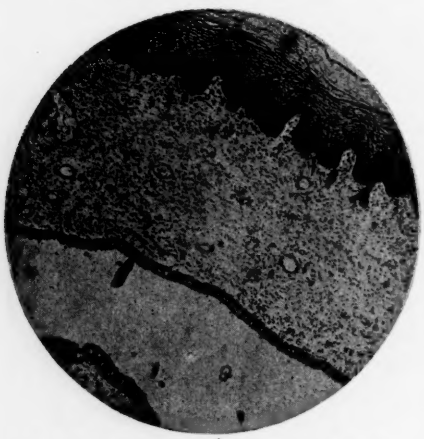

FIG. 3.—A cross-section of the polyp. The dark area above is vaginal mucosa, the light area is fibrous vascular tissue. The broad channel below lined on both sides by columnar epithelium is the curious channel running up into the center of the tumor.

also the period of the exploration of the interior of the uterus with the uterine sound.

While the gynecological world was jubilant over these successful attacks on the century-old problem of intrauterine pedunculate tumors, it was but natural that the attempt should be made to go a step further in attacking some of the sessile hemorrhagic tumors by incising the capsule, and by dissecting away a part of the growth and leaving the rest to slough. This "sphacelation" process was indeed widely spoken of as nature's own method of ridding the body of these tenants (Ramsbotham, 1853). T. Gaillard Thomas went so far as to invent and use a spoon with saw edges (his "spoon saw"), which though promising in its conception and appearance, proved disastrous in use, and was soon abandoned.

Anesthesia at this period allowed a better handling of the parts, and the vastly greater skill of our instrument makers was also an incalculable aid. With all this progress, however, the two cardinal dangers still lurked like spectres ready to destroy many lives; I refer to hemorrhage and sepsis.

We sometimes, too, took our chances in those early days, in view of the distressing condition of the patient. I well remember a woman (seen with Dr. Andrew K. Minich of Kensington, Philadelphia, in a way a father to me in my early work) in whom a large fibroid polyp completely filled the vagina, the pedicle could not be reached; I delivered it with an obstetric forceps, and was then able to attack the pedicle and remove it. Goodell had treated one in like manner, and so had J. Colvan in 1846. In Goodell's case it was necessary to incise the perineum to get the big growth out. With all the increased boldness, however, and the successes stimulating operators to greater efforts, there yet remained a great element of risk, making the intrauterine operations hazardous.

If immediate hemorrhage was controlled, there still remained the risk of a secondary hemorrhage (Herman, 1878); the dangers of sepsis were lessened, but now and then a patient was lost through an opening into the peritoneal cavity which was found inverted into the pedicle of the tumor, not to mention the occasional case in which an inverted uterus was itself mistaken for a fibroid polyp. A *cause célèbre* of this kind occurred in one of the big clinics in Germany. The distinguished professor while lecturing to his class on the dangers of just such a mistake, proceeded to operate, and on cutting through the pedicle of the tumor it was found to contain an inversion of the peritoneum, and the patient bled to death

then and there, so limited were the resources of our predecessors.

At last, in spite of bitter opposition, the fructifying principle of antisepsis and asepsis established itself in our hospitals, forced for the most part by the younger men on their unwilling elders. Gradually it came to be discovered that this new régime did not rest upon a chemical formula, but was a vivifying principle permeating the whole realm of surgery, and gradually there was developed that one great essential to its successful application—the antiseptic conscience. Simple as was the conception, so applicable here; if the door opened a crack for Levret's toe, and wide enough to permit a few like Sims and Simpson to enter with difficulty, up to the eighties of the last century, it then at last did finally swing wide open to the entire surgical profession, so that the whole difficult dark subject at last was cleared up and operations could be undertaken without dread and with entire assurance of success. It was not some clever instrument that was wanted, as our forefathers imagined, but a new principle of which they had never dreamed; it was the new principle which ushered in the

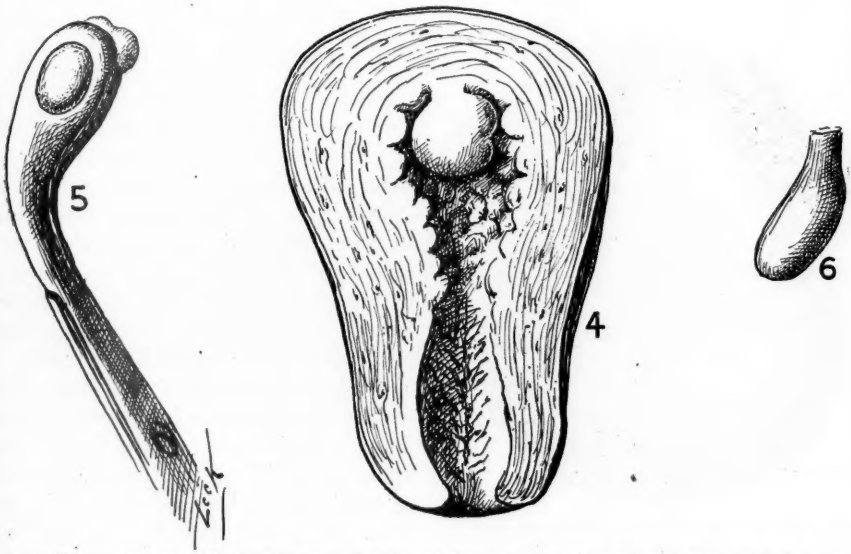

FIG. 4.—A fibrous polyp at the fundus the cause of prolonged hemorrhages. Fig. 5, the same grasped and removed by the polyp forceps. Fig. 6, another mucous polyp removed in this way.

easily expressed in a few words, it yet completely bowled over almost all of our older men in their futile efforts to grasp and to apply it, so at length one by one they gracefully yielded the sceptre to the younger men, and for the first time in the history of the world in surgery it was the young man's day.

THE OPERATION FOR POLYPS TO-DAY.

There is an old French saying dating from Sganarelle, the quack physician in Molière, "Nous avons changé tout cela," which each new generation adopts for its motto, as it forges ahead. This is peculiarly golden age of surgery which had at last arrived. To what extent it had arrived may be best illustrated by citing an operation which I saw August Martin do in his clinic in Berlin in the late eighties. The patient had a large submucous pedunculate fibroid tumor about as big as one's fist. Martin opened the abdomen and split the uterus wide open, and so removed the tumor; he then sewed up the incision.

To-day the first step is to make a diagnosis, which is important, as in a certain group of these cases it is still not infrequently missed. A careful inspection of the genital tract will reveal the cause of the

hemorrhages in most cases. A mere bimanual examination will not reveal everything, for some of the small soft cervical polyps cannot be felt except by the best trained touch, so one must look as well as feel, and the looking will often be rewarded by the discovery of one or two small raspberry-like mucous polyps hanging out of the cervix and crying for removal. By bimanual palpation of the uterus by rectum and abdomen one often recognizes its increased size and suspects the presence of a tumor within when it cannot be seen. Even

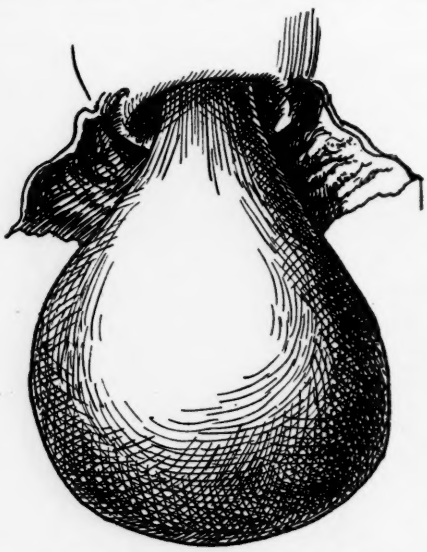

FIG. 7.—A fibrous polyp hanging out of the cervix into the vagina.

though there is an obvious large fibroid uterus it must be remembered that the bleeding may sometimes come from a single submucous pedunculate tumor which can easily be removed from below. Where the cause of the hemorrhage is not visible, a more thorough exploration should always be made under gas anesthesia. When the cervix is dilated and the body examined with curette and polyp forceps, using the latter to grasp any body projecting into the lumen of the uterus, a fibroid may now and then be felt by the uterine sound, but I have not found such great help from this instrument as from the polyp forceps figured. I have not infrequently seen women condemned to have their ovaries or their uterus removed on account of hemorrhage who have been perfectly relieved by a relatively simple and safe vaginal exploration and the subsequent operation.

METHODS OF OPERATING.

Little sessile cervical tumors may as a rule be safely twisted off at the cervix, or at the utmost the galvanocautery may be useful in cutting off the base and checking hemorrhage. A persistent hemorrhage can be controlled by pressure. Any tumor which presents a long accessible pedicle can be tied off near the tumor and the growth amputated. The fact that the antiseptic principle is now so universally accepted is sufficient reason for my not dwelling upon this part of the technique, which I assume to be the pole star of every one who calls himself a surgeon. It is well, however, in any intrauterine manipulations to wear rubber gloves and to clean up the field carefully. If the tumor is inaccessible inside the uterus it can be treated in one of several ways; smaller growths are discovered first when grasped by the polyp forceps; if such a tumor is not larger than a couple of centimeters in diameter it is safe in my experience to turn the forceps slowly until the pedicle gives way and the tumor is freed and can be removed. I have never seen any troublesome hemorrhage follow this bold plan of treatment. A mucous polyp grasped in this way often offers no resistance, and the operator may only know that he has found a polyp when he brings it away in the bite of the instrument. If my memory serves me aright, it was Dr. C. P. Noble who first suggested to me the routine use of the polyp forceps as an adjunct to the dilatation and curettage of the uterus. It is a most valuable expedient and ought never to be neglected in hemorrhagic cases. In a patient who had been condemned to have her ovaries removed some fifteen years ago, finding nothing below to explain the excessive loss of blood and knowing there was no malignancy from the curettages, I opened the abdomen, brought

up and delivered the uterine body, and then cut into its cavity ("hysterotomy"), an operation which I practiced many times in the nineties, but for which I now rarely find an occasion; this revealed a fibroid polyp at the fundus about an inch in diameter, which was removed with entire relief of all symptoms. I must add here that repeated experiences with the use of the polyp forceps for these many years make me feel sure that I would now at once detect and catch such a tumor as this was in my vaginal examination, and so terminate the matter much more simply. When the tumor is the size of an egg or larger and the cervix is not dilated, and so the growth is not readily accessible, the best plan then is, under a complete anesthesia, of a small egg, with a rather delicate pedicle, and was neatly amputated. Right at the site of the amputation was a funnel-shaped inversion of the peritoneum into the pedicle, and that this was not brought about by traction during the removal was evident from the fact that a few delicate strands of fibrin united the opposing peritoneal surfaces inside the funnel. I did not learn the fate of the patient.

In order to avoid such an accident as this or the commoner one of a big tumor with the fundus inverted into it, the only remaining obstacle to our perfect assurance in undertaking these operations, I have long resorted to the following expedient with entire satisfaction, namely, the bisection of all such tumors by grasping them at the

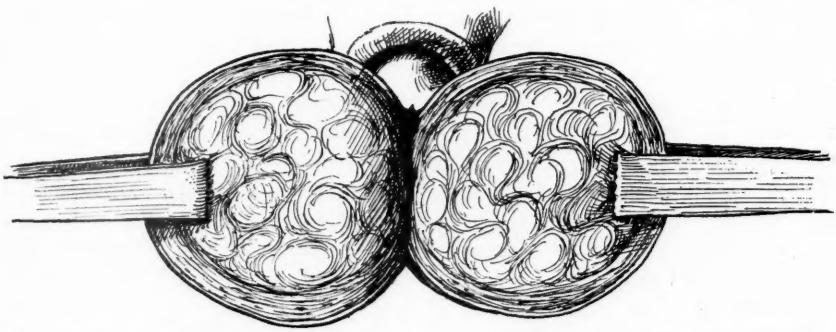

FIG. 8.—The best method of treating the same (Fig. 7) by bisection and then enucleation of each half separately.

to detach the cervix from the vagina anteriorly, catching it on both sides with a stout forceps, to incise the cervix up in the middle line, all the way into the uterine cavity, when the tumor can be grasped and removed and the cervix closed with sutures. A preliminary dilatation of the cervix will assist the subsequent drainage from the uterus. It is best in order to avoid accidents to treat all these cases seriously and to keep them in bed awhile, and then under observation for a time.

I spoke above of the risk of opening the peritoneum where there was a partial inversion of the uterus into the base of the tumor. I well remember seeing such a case in the museum of Professor Werth of Kiel, which dated from the time of his predecessor Litzmann. The tumor was the size exposed periphery with a museau forceps on the right and one on the left of the midline, and then cutting boldly down right through the middle of the tumor (Figs. 7 and 8) until the fibrous nodule is cut completely in two, but no more. The pedicle is then transfixed and tied. If there is any inversion it is always above this point. Such a plan greatly simplifies the operation as well as makes it safer.

I make no apology therefore for bringing up at this time, in this informal, reminiscent way, this old subject, for we are only too apt in these days, with our attention fixed on big surgery, to take it for granted that minor operations are all simple and need only be dealt with on general principles; in this way occasionally much harm is done.

The Vitamines and Their Relationship to Health and Disease[1]

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What are vitamines? This question can be answered only in an indirect manner for no one has ever been able, up to the present time, to isolate them in a perfectly pure state. It is known that they are inanimate organic bodies which are closely allied in some respects to the amino acids, in others to the enzymes, and still in other ways to the lipoids. It is also known, from biological experimentation, that this group of substances, vitamines, is absolutely indispensable to certain of the normal life processes.

But if the vitamines have not been separated so that we can examine them and tell exactly what they are, how can we be expected to consider them seriously? As to this question the reader is referred to similar inquiries that were made when the studies on enzymes and proteins began, and to the meager knowledge we now possess as to the chemical nature and structure of the antigens and antibodies.

No physician, pathologist, or bacteriologist, for example, doubts for a minute that a greater or less degree of immunity can be brought about with the proper antitoxin if it is given at the right stages and in proper dosage. Yet we know almost nothing positive as to the exact chemical or physical changes that are brought about by this method of procedure. It would have been the height of folly, if after the discovery of diphtheria antitoxin some twenty-five years ago, we had decided to delay its therapeutic use until some one had separated the active principle in pure chemical form. If such had been the case, we would still be looking forward with anticipation, in spite of the immense amount of work that has been done toward concentrating and purifying this antitoxin.

[1]From the Medical Research Department, Parke, Davis & Company, Detroit.

Science works from the unknown to the known and gradually builds up a structure to support its findings. Time, however, does not permit man to idly sit by and wait until such work is completed. It requires us, in the interest of humanity, to grasp our opportunities and apply them as best we can, and then modify or qualify these findings as the later unfolding of conditions suggests.

In this light let us consider the subject of vitamines with an open mind and reserve a decision as to their real value until we reach the end of this series of articles. For on the one hand there are those who are inclined to be skeptical regarding these vitamines, while on the other hand there are some who have gone to the other extreme and are perhaps too enthusiastic in their hopes and expectations. It behooves us, therefore, to make a survey of this field—an inventory as it were—and to determine with fairness a position in the matter with respect to the so-called deficiency diseases and the relation that the vitamines play therein.

ESSENTIAL TO NUTRITION.

Basically we are dealing in the case of vitamines with the problem of nutrition—the metabolism of the cell. If we can stimulate the building up of the weakened or worn-out cells, then we have at hand, of course, a powerful weapon which will aid in preventing and overcoming disease. In many pathological conditions the treatment for stimulating normal cellular metabolism depends primarily upon specific medication and secondarily upon nutrition. That is to say, these two ideas are constantly interdependent; sometimes one is the predominant factor, then again the other steps into the foreground.

At the present time most physicians think

of the nutritional phase of therapeutics by considering the dietary constituents that should be balanced, as the proteins, fats, carbohydrates, and mineral salts. If these four factors are properly adjusted, as to quality and quantity, they decide that the necessary amounts of energy and tissue building substances will be adequately supplied. From the newer aspects of nutrition, it appears that we must also reckon with an additional nutritive group, the vitamines, for without them, as we shall see later on, the fundamental metabolic processes will be so appreciably disturbed that the normal physiologic rhythm and sequence will not take place.

DISCOVERY OF VITAMINE.

It was some thirty-five to forty years ago that the etiology of beriberi—an endemic nerve disease which was very prevalent in the Orient—was found by the Japanese to be associated with a faulty diet. Eijkman was able to produce this disease experimentally in fowl by feeding them on milled rice. Later, Fraser and Stanton extracted a substance from the rice millings which prevented and cured the disease—polyneuritis—in pigeons. In 1911 Funk succeeded in concentrating this substance still further. In fact, he considered at that time that he had isolated the active principle, but later studies proved that he was wrong. From the chemical analysis that was made of this fraction, he considered that it had a basic group showing the characteristic properties of an amine. Since this material seemed so important to life he called it vitamine (vita-amine).

This vitamine related to and was specific for beriberi. Therefore, it was designated as the antiberiberi or antineuritic vitamine. We thus have the first definite illustration of a dietary deficiency disease with respect to the so-called vitamines.

Funk was of the opinion that there were probably other vitamines which would be found to be equally specific for other diseases. This same notion was possibly in the mind of Hopkins of England when he wrote in 1906:

"The animal body is adjusted to live either upon plant tissues or the tissues of other animals, and these contain countless substances other than proteins, carbohydrates, and fats. Physiological evolution, I believe, has made some of these well-nigh as essential as are the basal constituents of diet: lecithin, for instance, has been repeatedly shown to have a marked influence upon nutrition, and this just happens to be something already familiar, and a substance that happens to have been tried. The field is almost unexplored; only is it certain that there are many minor factors in all diets, of which the body takes account. In diseases such as rickets, and particularly in scurvy, we have had for long years knowledge of a dietetic factor; but though we know how to benefit these conditions, empirically, the scale errors in the diet are to this day quite obscure. They are, however, certainly of the kind which comprises these minimal qualitative factors that I am considering. Scurvy and rickets are conditions so severe that they force themselves upon our attention; but many other nutritive errors affect the health of individuals to a degree most important to themselves, and some of them depend upon unsuspected dietetic factors." (*Lancet*, 31, 1906.)

As an outgrowth of a series of researches, Hopkins reported in 1912 data which showed in the case of the albino rats that they required for normal growth not only the classical food nutrients, but in addition a minute amount of some constituent which was present in milk. This was the beginning of the exposition of the growth-promoting vitamine. In 1913, both McCollum, and Osborne and Mendel, working independently, published results which showed clearly that there was another factor that related to growth and body condition. This was found to be present and soluble in certain fats and oils, while the preceding vitamine was soluble in water.

Upon the basis of the solubility of these essential factors, McCollum suggested the classification as fat-soluble A and water-soluble B. Other workers have adopted this scheme in part but they prefer to use

in addition the term vitamines, or food hormones, or accessory food factors. In the case of the antiberiberi vitamine, it has been considered temporarily as being very similar if not identical with the water-soluble B.

Besides these two types of vitamines, there is a third one which Drummond, of the Lister Institute, has designated as water-soluble C. This vitamine appears to be specific for scurvy.

SOME COMMON SOURCES—REFINEMENT.

Having given a brief résumé of the discovery of vitamines, and a statement relative to their classification, it will be of interest to consider some of the foods and substances that contain them. The accompanying table gives a list of some of the common sources of these vitamines. It also illustrates a very important point which every physician and dietician should bear in mind, namely, that a substance which is rich in one vitamine does not necessarily contain either of the others. Thus cod-liver oil and butter-fat possess the fat-soluble vitamine while they do not carry any of the other two types. Likewise, yeast should be rich in the water-soluble B food hormone, but it never contains any of the fat-soluble A or water-soluble C types. On the other hand, orange juice has some of the water-soluble B and water-soluble C vitamines in it.

Vitamines Appreciably Present in—		Vitamines Practically Absent in—	
Fat-soluble Type.			
Cod-liver oil	++++	Yeast	−
Butter-fat	+++	Vegetable oils	−
Cream	++	Seeds	+ ?
Egg fat	++	Lard	+ ?
Green leaves	++	Nuts	−
Water-soluble B (Antineuritic) Types.			
Yeast	+++	Cod-liver oil	−
Germs of seeds	+++	Vegetable oils	−
Rice millings	+++	Lard	−
Natural grains	++	Butter-fat	−
Nuts	++	Milled products, as rice, flour, etc.	−
Some vegetables	++	Cooked foods	+ ?
Orange juice	++		
Skimmed milk	+		
Water-soluble C Type.			
Lime and lemon juice	+++	Yeast	−
Orange juice	+++	Cod-liver oil	−
Tomato	++	Nuts	−
Some fresh vegetables	++	Grains and seeds	−
Sprouted seeds	++	Canned foods	+ ?
Fresh unpasteurized milk	+	Cured meats	−
		Cooked foods	+ ?

Again, one should bear in mind that a substance in its natural or fresh state may contain the vitamines yet it may lose them during the process of refining or preparation for consumption, either due to mechanical or chemical means. Thus, cod-liver oil in the crude state is very rich in the fat-soluble vitamines, but unless due precautions are taken during the process of purification the resulting oil may become extremely low in this vitamine.

If oxidation is allowed to go on it is very injurious to this vitamine, as well as the water-soluble C type. If alkalies are added to a food rich in the water-soluble B or C and heat is applied destruction will follow very rapidly. Contact with certain metals, as copper, will prove detrimental to the water-soluble C.

EFFECT OF COOKING.

A further point in question should be considered in passing, namely, the effect of cooking upon the vitamine content of foods. The essential facts that should always be borne in mind with respect to cooked foods are: First, in the case of stewing or boiling foods the water-soluble constituents pass into the liquor, and unless this is saved for soup, gravy, etc., the resulting cooked food will be very much depleted in these vitamines; second, the liquor must be faintly or distinctly acid—the presence of alkalies under these conditions is very injurious; third, the degree of heat and the length of time of cooking are very important factors to bear in mind; and fourth, the extent of oxidation that goes on during the boiling, roasting, baking, or frying of the food influences in direct proportion the destruction of both the fat-soluble and water-soluble C vitamines.

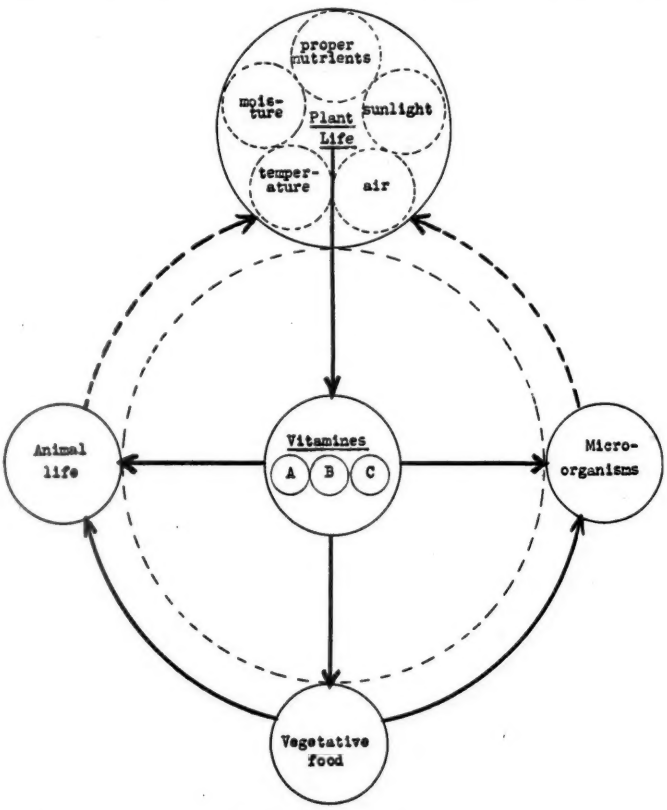
The following table shows the relative vitamine content of some uncooked and cooked foods:

Comparative Antiscorbutic (Water-soluble C) Value of Equivalent Weight of Substances.[1]

Fresh lemon or orange juice (raw)	100
" cabbage leaves or juice (raw)	100
" " " cooked 100° C. for 20 min.	30
" " " " 70°-80° C. for 70 min.	10
" Swede or turnip (raw)	60
" tomatoes (raw)	60
" green beans (raw)	30
Potato, cooked 100° C. for 30 min.	7.5
Fresh carrot juice (raw)	7.5
" beet-root juice (raw), less than	7.5
" beet juice (raw)	7.5
Dry beans, peas, etc. (raw)	7.5
Fresh cow's milk (raw)	1 to 1.5
Germinated beans, peas, etc. (raw)	30

tent of the food is lowered. For example, carrots and apples are much lower in vitamines after storage than when fresh. Likewise, milk, if not pasteurized properly and then cooled quickly, will be almost devoid of the water-soluble C vitamine. "Bleached" and "burned" hay, which are sometimes fed farm animals, are both lower in the fat-soluble vitamine than when properly cured. In the silo the vitamines are destroyed to a greater or less extent.

Besides these changes which may take



VITAMINE CYCLE.

Vitamines are synthesized by plants and not by animals. Vitamines in foods are altered to a greater or less extent by sunlight, increased temperatures, oxidation, alkalinity, and age.

EFFECT OF STORAGE—OTHER FUNDAMENTAL FACTS.

During the storage of vegetables and fruits the enzymic changes seem to so alter the chemical balance that the vitamine content place in a substance that has contained the vitamines, there are other fundamental facts that should be considered in evaluating a food or a product in respect to the relative amount of vitamines it carries.

Vitamines are synthesized by plants. They are not considered to be synthesized

[1]Chick & Dalyell: *Brit. Med. Journal*, 1921.

by animals, although there is some doubt on this point with respect to the water-soluble C. The vitamines are stored in the animal tissues to a limited extent only. As a result the animal organism is dependent largely, if not entirely, upon the plant kingdom for its vitamines.

Further, it is known that the rate of growth of plant life and the kind of end-products produced are influenced to some extent by the amount of vitamines that are available in the medium or soil upon which the material is grown. For example, the growth of the yeast cell and the vitamine content of the cell are dependent upon the proper balancing of the nutrients in the media. Thus, we have some lots of yeasts that are rich in the vitamine B and others that contain little or none of it. It has also been shown that the fertility of the soil influences the vitamine content of the crops raised. The leaf of alfalfa hay, for instance, should be rich in the vitamine A, but it may be low in this fat-soluble vitamine due apparently to the condition of the soil. The quality of the milk and butter obtained from dairy cows fed upon this hay will be affected in a corresponding manner. The same thing may be said with respect to the water-soluble C, for this vitamine is the most unstable and labile of the three types.

These facts are illustrated in the accompanying chart, where the vitamine cycle is represented graphically. Here beginning with plant life, which is dependent for its ultimate success upon the proper nutrients, moisture, sunlight, temperature, and air, the vitamines are supplied to both animal life and the microörganism. The ultimate outgrowth of plant life is fruition in the form of vegetables or fruit. If these are in turn consumed by animal life and the microörganisms, the vitamines are again supplied to them, *provided* the vegetative life has not been subjected to conditions which have altered or destroyed the vitamines.

COMPLEX PROBLEM.

It is thus seen that we are dealing, in the case of the vitamines, with a very complex problem, one that calls for careful and sane consideration. We can see that we are not justified in drawing any broad conclusions as to what foods or substances contain an appreciable amount of the vitamines A, B, or C, without knowing the previous history of the material. Even then, we should be cautious in making our predictions as to the relative amount of vitamine that may be in the foods after they are prepared for consumption. Furthermore, one should consider that even though a substance may contain one or more of these so-called vitamines to a comparatively high degree, the fact still remains that this particular substance may be of such a nature as to cause a disturbance in the digestive tract and render the assimilation and beneficial effect of the vitamines impossible.

In other words, it would appear that the most logical point of view, at the present stage of our knowledge of this subject, is to take a conservative and rational position in the matter.

[In the next two articles the author will take up the question of how we can tell when vitamines are present, and the effects produced by their absence.]

(To be continued.)

The Action of the Different Elements of Diet in Infant Feeding—Experiences with the Czerny-Kleinschmidt Butter-flour Food[1]

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My purpose is to consider the old and much discussed, yet ever new and ever puzzling problem of infant feeding in some of its aspects. The subject in its entirety is too vast for more than a brief review of some salient features. I desire, too, especially to report the results of some interesting trials of the butter-flour food as recommended by Czerny and Kleinschmidt.

One advantage in having practiced medicine for a good many years is that one can review from actual personal experience some of the changes of views and advancements in knowledge of any subject in which one has been particularly interested during such a period. I wish, therefore, first to review with you some of the opinions which have obtained during this time with regard to the action of the elements of the food for the infant. About the time I commenced to practice medicine, there existed a growing belief in the injuriousness of too much casein in the infant's diet. This was based, to some extent at least, upon the studies of Biedert, who had shown that the normal amount of protein in human milk was but 1 or 1.5 per cent, and on the knowledge that in cow's milk the percentage of casein much exceeds that of the whey-proteins, lactalbumin and lactoglobulin, while this is not true of human milk. Consequently the view was emphasized, especially by Rotch, that the protein in the infant's food should not exceed the proportion existing in cow's milk, or should even fall below it, on account of the excess of casein present; and it was further urged that by the system of "differential protein feeding" the amount of whey-protein might with advantage be relatively increased until it equaled or exceeded that of the casein. It was believed, further, that the fat should approximately equal in amount that present in human milk, and the sugar as well.

Good results were obtained, as they will often be by any method of feeding within the bounds of reason. Yet as the years passed it began to be impressed on a number of pediatrists, apparently nearly simultaneously, that for some reason the fat of the infant's artificial food was *not* tolerated as in theory we had expected it ought to be. Sometimes it seemed that the fatter the food the less the infant appeared to gain, even without there being any very positive evidences of fat-indigestion. This started a swing in the other direction, and we devoted ourselves to the employment of mixtures in which the percentage of fat was low. There was very much of reason in this last practice, which is still the prevailing one. The cow's milk fat is *not* digested as well as is that of human milk. However, with these newer views, in which the milk-mixture was low in the percentage of fat and only equaled in its percentage of protein that of human milk, it was evident that *something* must be added to make up the deficiency in calories, and for this purpose the amount of carbohydrate was increased. Since, however, it had been maintained that the normal infant did not well tolerate more than 7 per cent of lactose, and as more than 7 per cent of carbohydrate was often required, it became the practice to increase the carbohydrate percentage by the employment of other sugars, often with the addition of starch in some form; and the belief held sway, and still does in many quarters, that it was a matter of indifference whether the desired calories were obtained from the fat or from the carbohydrate. Just why starch did good one did not entirely know, but it was a clinical experience, based, presum-

[1]Address given before the Northampton County Medical Society, April 15, 1921.

ably, on the early custom of the laity to feed infants with "pap."

Next came the publication of the views of Finkelstein, and these swept like wildfire over Germany and to a large extent elsewhere. These views in part consisted of the claim that casein can be safely ingested by the infant in practically unlimited amount, and the fat, too, in good measure, if only the whey-protein and the salts were reduced. At first it was believed that the sugar also must be diminished in amount, but experience soon convinced pediatrists that this could not be done for any length of time, and the infant be expected to thrive. That Finkelstein's protein-milk, or "Eiweiss" milk, did good in very many cases was beyond question; but a grave doubt arose in the minds of many as to whether the theory for its favorable action was correct. In fact it has been maintained that the good results do not depend solely, if at all, on any one of the conditions believed by Finkelstein to be the cause.

Last of all there has been in recent years an increasing belief, first, that protein was not the harmless agent which many physicians had claimed; and second, that it was far from a matter of indifference whether fat on the one hand, or carbohydrate on the other, was used in the food. It was noticed that babies long fed on protein-milk eventually developed a certain degree of bluish pallor, that soap-stools began to be excreted, and that cessation of gain in weight occurred; and experience showed that these symptoms would sometimes disappear if malt extract or starch, or both, were added to the diet. It was found, too, that infants fed on a mixture fairly rich in fat acquired an appearance of health which was absent in those in whom the carbohydrate had largely replaced this. All this was independent of the presence in the fat of the milk of certain vitamines now supposed to be necessary to the thriving of the infant. Doubtless these exist, and constitute another reason why sufficient fat in the food is absolutely necessary to the best condition of health. I shall, however, not discuss this side of the question. It is very interesting in this connection to note that in the earlier "Rotch period," if one may call it so, the presence of a considerable amount of fat was considered necessary for the prevention of the development of rickets; and that now the views of Mellanby of England, adopted by many, uphold this same relationship of the diet to this disease. Neither early in my professional experience nor now do I feel as yet convinced that the presence or absence of fat is the deciding etiological element in the production of rickets, and this is the opinion of many others.

Here I must discuss for a moment a certain retrograde movement which developed a few years ago, which, in my opinion, has done and is doing much harm. Based probably on views expressed especially by Heubner, but not with his scientific purpose, the effort was made in this country to "simplify" infant feeding by the employment of mere dilutions of milk with water, with the addition of sugar. The only claim advanced for the usefulness of this procedure was that it made infant feeding simpler for the physician. Now while simplification is desirable, accomplishing this at the expense of the infant is wrong; and while undoubtedly many infants will thrive, and do thrive, when fed in this way, yet the method itself is unscientific, and for many infants entirely impracticable. The range of variation in the food which this method offers is too limited, and it never permits of the giving of a properly large amount of fat with a properly small amount of protein, such as the most modern pediatric practice believes should be our aim. You will readily observe the contrast between, on the one hand, this "easy method" which teaches nothing as to the action of the different food elements, and leaves the physician helpless when difficulties arise; and, on the other hand, the constant effort on the part of scientific pediatrists everywhere to *understand* the real needs of the infant in the matter of its diet, to appreciate the action which each element of the food may be expected to exert and their mutual influence one upon another, and with this knowledge to devise a food which offers the

best hope of producing in the individual infant the best result. Ease in the method of accomplishing this should not be the question.

There is no easy method of infant feeding; there cannot be. We are giving the artificially fed infant something which it was never intended by nature that it should have; although we may obtain good results even sometimes with slipshod methods, in other cases we shall fail; and unless we have used every possible source of knowledge in the selection of our food, we are responsible for the bad and often fatal results which ensue. The man who is not willing to take trouble without end to get the very best result has no business to undertake infant feeding. The subject of infant feeding is never easy, and this is not my own opinion alone. In a journal article by Stolte, one of the well-known scientific continental pediatrists, the first sentence, translated, is as follows: "It is an extraordinarily difficult undertaking to raise a new-born human being with artificial food. Even though here and there children can be brought to a condition of splendid thriving with the most different methods, yet the results are far from being so sure of achievement that one can speak of a solution of the problem." Still later Czerny and Kleinschmidt, the names of both familiar to every pediatrist, say: "It is not unknown to every physician who is occupied either in private practice or in institutional work with the nourishment of infants, that the problem is accompanied by great difficulty in many cases, and especially is without that degree of certainty for which all of us would wish."

We may then with advantage consider briefly what are the needs of the infant in respect to the different elements of the food, and how well or ill each of these may be utilized. *Protein* is, of course, absolutely necessary, as it is the only nitrogenous substance in the diet. It is about the protein which I especially wish to speak in this connection, since the prevailing opinions about the manner of its employment and the tolerance for it are, I think, erroneous. Although it is necessary, it is not needed in large amount—only about 7 per cent of the total calories of the diet representing the utmost need of the infant. Contrast this need with the amount supplied in protein-milk and similar foods—*i.e.*, about 30 per cent! Again, there is another interesting feature regarding the protein which has been pointed out by Hoobler and others, viz., that you cannot replace the carbohydrate and the fat of the food by increasing the amount of protein, even from a mere calorimetric point of view. An increase of protein increases the protein metabolism, but that of the other elements goes on just the same, and if you do not supply them they will be absorbed from the stored-up glycogen and fat in the economy. But the employer of "simple dilutions," or he who thinks only of "replacement," apparently knows nothing about or ignores this fact. One other matter I must refer to, viz., the fact that the percentage of protein in human milk does not increase as the infant grows older, but becomes, if anything, rather less—an indication that all the printed tables of rules for infant feeding in which the strength of the protein increases with the age of the child are theoretically wrong. There are reasons, it is true, why the percentage of protein may well be increased in the latter half of the first year, but they are not because the increased amount of protein as such is needed, and certainly no rule can be formulated regarding it.

Finally, because the subject of the protein is so important, and because of the prevalence of the views of Finkelstein regarding this, I want to refer to just a few statements of recent writers upon this subject. Tanaka concluded from a careful review of the subject, combined with his own experiences, that although an increase of protein causes an increase of absorption of it, this was not retained, and those infants on a high protein diet finally cease to grow. Hoobler found that a decided excess of protein could produce a condition of apathy and even finally of semi-stupor. Benjamin observed a continued failure to gain weight when a high protein diet was

administered too long, and Glanzmann reports injury from protein when in overamount, consisting of unhealthy appearance, loss of strength, meteorism, and other unfavorable symptoms. He regards protein-milk as unsuitable for a permanent diet. Bessau in a long article upon the pathology of injuries from milk, states that there is no more question of the production of injury by protein than there is by fat. The blue-gray appearance of infants fed long on protein-milk is a symptom of a high protein diet. Similar views are expressed by others, but there is no need for further quotation.

Nothing of what has just been said is intended to oppose a high protein diet as a therapeutic measure for a specific purpose and for a limited period, but is an expression against its continued employment when the emergency has passed.

Next we may briefly consider the *fat*. Normally this is very well absorbed from the intestine, more than 90 per cent being thus utilized. Frequently, however, especially in bottle-fed babies whose digestion is not normal, a large amount of fat is excreted either in the form of soft white curds, or in that of salve-like or hard soaps. In other cases fat is an active cause of sour, curdy vomiting. There is little doubt that more artificially fed infants are made ill by an excess of fat than by any other element of the food. With a fatty diarrhea there is a loss of potassium and sodium from the system, and with soap-stools calcium and magnesium may be excreted in excess, and in either event the child suffers and increase of weight ceases. When, then, this indigestion of fat develops, it becomes necessary either to replace the fat by carbohydrate to a large extent, or to render it in some way more easy of assimilation. The first plan is by far the simplest, and often works well for a time, but, as I have already said, the replacement is advisable, as a rule, only for a time. A sufficient amount of fat must be present to insure a proper absorption of calcium, and Orgler, among others, has pointed out that infants fed too long on carbohydrate substitutes suffer a loss of water from the system, and a diminution in the general well-being. The high percentage of fat present in breast-milk is certainly not without significance as to the needs of the infant. Therefore, whenever we can, it is best to retain the fat as far as possible, and to attempt to make it more digestible in some manner. This can often be accomplished by the mere addition of a high carbohydrate percentage, especially if it consists in part of starch. It is not so much the excess of fat as the lack of proper proportion between the elements of the food which is detrimental. Both malt-soup and the new butter-flour mixture are useful in this connection. These will be referred to later. The cause of the disagreement of the fat in artificially fed infants probably depends largely upon the difference in composition between the fat of the milk of the woman and of the cow respectively. The latter contains a very much larger percentage of the volatile fatty acids than does the former, and it is on this that the sour, rancid vomiting depends in most instances. Let me remove at once any misapprehension as to my own views in this connection. I have been for years, and still am, a firm believer in the giving of diets very low in the fat-percentage to infants with evidences of fat-indigestion. I find more trouble with fat than with any other element. But such diets are to be employed as therapeutic measures, and a return to one containing a larger amount of fat made as soon as it can be done safely.

Next in order comes the *carbohydrate*. The sugar of the food is entirely absorbed, and it is astonishing, also, how early in life any starch which may have been added to the diet is nearly or quite utilized. As to the sugar, although lactose is the natural variety in the infant's food, and is more slowly absorbed and therefore more liable to maintain a proper condition of the intestinal flora, yet there are numerous cases where some other form of sugar is more suitable. In some instances saccharose may be serviceable, and in others, and more frequently, a maltose-dextrin preparation. Maltose alone is liable to be laxative in

action, although this is not always the case. The action of starch in the digestive processes would seem to be manifold. It may act in part mechanically like a colloid, as has been claimed, and disintegrate the masses of fat and of protein more thoroughly. It is probable, too, that it aids in the maintenance of the proper flora in the lower intestinal tract, on account of the longer time required for its conversion and absorption. If lactose or maltose-dextrin preparations are used alone, they may be absorbed too rapidly, and the proteolytic germs consequently prevail in the lower intestinal tract of the artificially fed baby, instead of the lactic acid group, as is the case in the breast-fed. Starch, according to Bessau, especially if combined with malt extract, will change this condition to that normal for the infant. Then in some obstinate cases of vomiting, as, for instance, in pyloric stenosis, there is no question but that a thick starchy gruel is less easily vomited than is a thinner food.

Yet carbohydrates in excess may produce a disordered condition. Not infrequently an acid diarrhea develops which causes excoriation of the buttocks; and vomiting, too, is not uncommonly produced by an excess of sugar. Further, a diet exclusively starchy may produce edema, perhaps with a hypertonic condition. One may then readily be deceived by an apparent gain in weight in the infant which in reality depends upon water in the tissues.

As regards the *salts* of the food, our knowledge is very limited. There is an abundance of these substances in the artificial mixture. The question is as to their absorption and retention. Calcium is not well absorbed if the fat is insufficient, and a negative calcium balance develops if the protein is in excess.

Finally, with the discussion of theories which we have just had in mind, we may consider a few of the methods and food formulæ which may serve us well in time of need. First, as to infants with normal or nearly normal digestion. That human milk contains 4 per cent of fat, 7 per cent of sugar, and 1 to 1.5 per cent of protein is, as I said, suggestive. There must be a reason for it, just as there must be a reason why the calf needs less sugar and from 3.5 to 4 per cent of protein. It would seem indicated, then, that, whenever we can, we should supply the young infant with a food containing sufficient fat and not more than 1.5 per cent protein. We can seldom give the full 4 per cent of fat in an ordinary milk mixture, because, probably, of the volatile fatty acids of the cow's milk fat; but we may often make the fat more digestible by the addition of a strong barley or other cereal decoction.

I have been especially interested recently in trying a food which was proposed by Czerny and Kleinschmidt, to be used especially in young or premature, underweight infants without any very active digestive symptoms—just such cases as ought to have human milk if it could be obtained. The formula employed by them, in what they call their "butter-flour" mixture, was based upon an attempt to approximate the composition of human milk more closely. The fat-percentage was kept high, but the volatile fatty acids were driven off by heat. The protein was kept down to the percentage of human milk. The carbohydrate was high, and consisted partly of starch, which was partially dextrinized by the heat employed in making the mixture. It was used because it clearly added to the assimilability of the high percentage of fat. The proportions recommended by them consist of 7 grammes of butter, 7 grammes of flour, 5 grammes of sugar, and 100 Cc. of water, to be mixed with varying amounts of milk, according to the age and weight of the patient. These figures may conveniently be rounded off to, say, 20 grammes of butter, 20 grammes of flour, and 15 grammes of sugar in 300 Cc. of water, but the relationship of the butter to the flour must remain unchanged. For new-born, underweight infants the amount of butter and of flour may well be reduced to 5 grammes, and that of sugar to 4 grammes, in the 100 Cc. of water. In the actual process of preparation, 20 grammes of butter are placed in a pan and heated over a gentle fire

until foaming takes place, and until any odor of volatile fatty acids has disappeared. This requires from three to five minutes. With this are now mixed 20 grammes of fine wheat flour, and the mass again boiled over a gentle fire with constant stirring until it becomes thin and of a brownish color (four or five minutes). Finally 300 grammes of warm water and 15 grammes of cane-sugar are added, and the combination again boiled, rubbed through a fine sieve to remove lumps, and then mixed with the desired amount of previously boiled, cooled milk, and the whole kept cold in individual bottles until ready to be used. The addition of salt is not necessary, as this is contained in the butter. For children under 3000 grammes in weight one-third milk is mixed with two-thirds of the butter-flour mixture. For those of 3000 grammes or over two-fifths of milk and three-fifths of the butter-flour stock are employed. Not more than 200 grammes per kilogramme of body-weight—*i.e.*, about 3 fluidounces per pound—should be given daily, and smaller amounts than this are usually required, owing to the high caloric value of the food. The authors lay particular emphasis upon the importance of giving this restricted amount. The results were truly remarkable. Not only did the weight go steadily up as in breast-fed infants, without the irregularities usually seen in the bottle-fed; but the general appearance, color, distribution of fat, and the like, all resembled the conditions seen in the breast-fed child. There was no abdominal distention; infants who had been vomiting did not experience an increase of this, but often a diminution, and the stools were yellow and of good character.

Although not expecting and not obtaining good results in every instance, Czerny and Kleinschmidt yet found on the whole better results than from any other method of feeding with which they were acquainted. The proper selection of the cases was very important. They did not recommend the food for infants with severe acute digestive disturbances, with or without fever, but rather for the weakly and often premature infants much below weight, who had not been made to thrive on other foods which had been given. They found it frequently of benefit in very young, premature infants when alternated with the administration of breast milk, in cases in which there was not sufficient of the latter to permit of breast feeding alone. One great advantage of this method of feeding was that it could be continued with benefit for months. There was no necessity for an early abandoning of it as with protein milk or some other foods.

The need of aid in our methods of feeding in difficult cases in infancy is shown by the fact that numerous other investigators have followed in the footsteps of Czerny and Kleinschmidt, and in nearly all cases with remarkably good results. In fact there has developed an enthusiasm for the new food strongly reminiscent of that which was evidenced when the Finkelstein protein milk was first brought to the attention of the medical profession. One needs only to note the reports from such well-known names as Moro, Stolte, Bessau, Langstein, Thiemich, Berend, and many others. I need not occupy your time by giving you abstracts of what they say. The opinion is almost unanimously favorable. Dr. Mitchell and myself have been using this food in the Children's Hospital in the last few months with great success. Our cases there furnish a very searching test of the value of the food; for we have not only premature, under-weight children to deal with, but those who have suffered from previous prolonged digestive disturbances, a class of cases for which the food was not originally devised, and yet our results were good. In one case the infant was five months old on admission, and had been in the hospital for over two months, fed with almost every conceivable method without any benefit whatever. The child was a wretched subject weighing only seven pounds when the butter-flour food was commenced. Improvement began promptly and continued without intermission. Another baby presented such a miserable aspect that the mother dreaded visiting it, and in fact did so only at long intervals. After the admin-

istration of the butter-flour food for a time, its appearance had changed so much for the better that the mother could hardly believe it was her own baby. Of course, not all our results were as good as these, but on the whole they were surprising. Of 30 infants only 9 did not do well, and in nearly all of these improvement on any plan of feeding whatever could not have been expected, since most of them were incurably ill with disorders other than digestive.

In order to render the preparation of the food more simple in the household, where scales and gramme-weights and the like are rarely accessible, we determined the equivalents in ordinary household measures, and the following modified description of the preparation may be given: A small amount of butter is placed in a glass, and this stood in warm water until it melts. The butter-flour mixture is then constructed by using 2 tablespoonfuls of melted butter, 2½ level tablespoonfuls of flour, 1½ level tablespoonfuls of cane-sugar, and 10 fluidounces of water, instead of the 20 grammes each of butter and flour, the 15 grammes of sugar, and the 300 grammes of water. These, of course, are treated exactly according to the method already described.

In the short time remaining to me I wish to refer to a few other methods of feeding, long in use in certain disordered digestive conditions, since the butter-flour food is intended, as stated, especially for infants without these. First I will refer again to the employment of gruel in some obstinate vomiting cases. This is useful not only in pyloric stenosis, but in obstinate habitual vomiting in young infants, for not only is the digestive power perhaps diminished, but the nervous control of the stomach has become hypersensitive and the habit of vomiting has become established. I have had some splendid results in infants who have vomited every other kind of nourishment which we had tried. The gruel should be of 5- or 10-per-cent strength, made from rice-flour, wheat-flour, or farina, using at first 1 part of skimmed milk and 3 parts of water. Later, if successful, the skimmed milk can be increased in amount, and finally the skimming can be omitted. We must remember that this and other preparations to be mentioned are only for temporary therapeutic use. We should return as soon as we can to the principles already emphasized regarding the desirability of giving the infant a sufficient amount of fat.

Next I would mention the dietetic treatment of cases with the persistence of soap-stools and cessation of gain in weight, as well as of those with large, white, curdy masses in a green stool. Here we may often accomplish excellent results with malt-soup. This, as you know, consists of a combination of a non-diastatic malt extract with wheat-flour, water, and milk. The method of preparation commonly advised is well known, and I need not enter into it here. Ordinarily we may well follow the formula proposed by Keller, which is furnished with the malt-soup extract as supplied by the different makers. The good results are usually attributed to the reduction of the fat to about 1.33 per cent; but we must not forget, as Benjamin has pointed out, that we also have a low protein percentage equaling about that of human milk. The carbohydrate percentage is high, about 11.5 per cent, and consists partly of starch, since the non-diastatic malt extract has had its power of converting the starch removed in the process of its preparation. Under this food the excess of fat will often disappear promptly from the stools and gain in weight will recommence. There are two disadvantages often accompanying the employment of this diet—the first that babies who are disposed to vomit will often not tolerate the high percentage of sugar; the second that the food is often distinctly laxative, and this appears to be especially true of the liquid malt-soup extracts on the market. These symptoms can be ignored if they are not very marked and if the gain in weight is satisfactory. If it is necessary to control them, the malt extract may be reduced a little in amount, or for the diarrhea an astringent medicine may also be given.

When the infant shows a very decided intolerance for fat, there is no diet in my experience as good as the popular butter-

milk mixture which has been used for many years by the laity of Germany and Holland. By buttermilk I mean really a *buttermilk*, made at home, and from which the butter has been removed by churning in a small churn. It may be prepared as follows: To 1 quart of milk, previously pasteurized, is added the contents of a tube containing a reliable liquid culture of the Bulgarian bacillus. The milk is now allowed to stand from 18 to 24 hours at a temperature of 100° or somewhat less, until it exhibits a fine, flocculent, curdy apperance. If it stands too long it will grow far too sour, and will separate into a solid mass of curds and a whey-like liquid. After the proper degree of coagulation has taken place, the butter is removed by churning in a small glass churn. One level tablespoonful of wheat-flour is now rubbed into a paste with 6 or 8 ounces of the buttermilk, and 4½ level tablespoonfuls of granulated sugar added; this is then mixed with the remainder of the quart, and the whole boiled gently for 25 minutes with constant, vigorous stirring. Neglect of the stirring allows the mixture to become too lumpy. The buttermilk mixture prepared in this way contains approximately 1 per cent of fat, 11 per cent of carbohydrate, and 4 per cent of protein, but these figures vary somewhat. If it is desired to maintain the Bulgarian bacillus alive, the milk should first be pasteurized; the buttermilk then made from this; the flour then boiled with a small amount of the buttermilk, and this, with the sugar, be added to the remainder of the quart of unboiled buttermilk. The final boiling is to be omitted. It is surprising how often this buttermilk food will quickly alter the condition of the bowel movements. I have had perhaps better results with this than with any other method of treating fat indigestion, either intestinal or gastric. Sometimes the high percentage of sugar causes vomiting. In that event the amount of it should be reduced.

Finally a word regarding the protein milk or "Eiweiss milk" of Finkelstein. The method of its preparation is decidedly complicated, and need not be given here. It can be found in any text-book on the diseases of children. The food contains about 2½ per cent of fat, 1½ per cent of lactose, and 3 per cent of protein. Later the percentage of sugar should be raised by the addition of a maltose-dextrin preparation. The mixture has been found very useful, particularly in chronic diarrheal conditions. We must not forget what has already been pointed out as to the unfavorable effects if it is continued too long. Its employment should be regarded as a purely therapeutic measure.

Luetin.

WARD, in the *American Journal of Syphilis* for July, 1921, calls attention to the finding of 87 per cent positive luetin reactions in 42 syphilitics. In a second series of 200 unselected cases attending the public clinic there were 75 per cent corroborative returns.

As an indicator of the value of antisyphilitic treatment it has verified the Wassermann test in a high proportion of cases, but remained positive in 10 to 15 per cent.

These findings are suggestive that luetin as a measure of the allergic reaction in syphilis has a much higher value both negatively and positively than has been emphasized heretofore.

Criticism of both the luetin test and reaction has been due to a lack of study and experience rather than from skill in estimating values. Luetin itself is in need of standardization and could be easily improved.

The findings and the opinions recorded here are clearly in harmony with original reports and the more recent literature.

In view of these facts it is believed that the complement fixation and the luetin test should be made simultaneously in every suspected case of syphilis.

Alone each expresses but a limited truth; together a more rational conception is possible, and this is seriously suggestive in the supremely important question, "Is the case cured?"

Editorial

CHANGES IN CARDIAC FUNCTION PRODUCED BY DISEASE.

The remarkable advances which have been made in our conception of cardiac conditions by the employment of the polygraph and the electrocardiograph have modified and controlled our use of digitalis and near-related drugs to a very great degree, proving that massive doses of digitalis in some instances may save life and in other instances may hurry death. Most of the studies have been made upon normal hearts or hearts suffering from valvular or myocardial lesions of a subacute or chronic nature, but far too little has been done in the way of investigating cardiac conditions in the course of acute infectious diseases, which is the more remarkable because in pneumonia, typhoid fever, and other infections, as, for example, rheumatism, the condition of the patient is usually not such as to forbid an electrocardiographic study.

It is entirely possible, and indeed likely, that the toxemias of various infections may produce functional or organic changes, temporary or permanent, in the heart muscle which will strongly indicate a drug on the one hand and contraindicate it on the other. In our opinion the day is not far distant when we will learn that in many cases of the acute infections digitalis is absolutely essential, and in others is absolutely deleterious, although in both types evidences of cardiac incapacity may be manifested.

Greene and Gilbert have recently carried out a study dealing not so much with the effects of infection on the cardiac muscle as upon the influence of lack of oxygen or an excess of CO_2, conditions which are often present in the acute infections, notably in penumonia, and which may also be present in instances where there is ruptured compensation with impaired cardiac and respiratory activity. They point out that the electrocardiogram of man is not materially altered by slowly induced oxygen deficiency until a certain stage or crisis is reached when fundamental intrinsic changes in the cardiac mechanism begin. There is a decrease or shortening of the time of the P-R interval and an acceleration in conduction time coincident with augmentation of the heart-rate from exercise, although this augmentation is not universally observed. There is a decrease in the total time of the R-T interval similar in type and reaction frequency to the change in conduction time, and a marked decrease in the amplitude of the T wave. Sometimes the T wave comes diphasic.

When the want of oxygen is extreme, there is great slowing of rate, a progressive descending displacement of the pace-maker, or center of rhythm production, toward and into the A-V node, and interference with normal conduction leading to dissociation. This latter statement is of interest in connection with the administration of digitalis, since digitalis in full dose tends in many cases to induce dissociation and, therefore, in the presence of asphyxia may do harm rather than good. Indeed, in some instances they found that there was complete suppression of conduction although no digitalis was administered.

Possibly in these facts we find an explanation of the advantage to the patient of administering caffeine in full doses, since this drug by stimulating the respiratory center tends to overcome the oxygen want and stimulates the heart, but does not tend to increase block; and again these researches may explain the value of atropine, which tends to diminish block and which heretofore has been supposed to act chiefly by its influence on the vagus or on the vasomotor system.

INTRAPERITONEAL INJECTION.

More than once within recent years we have called attention to the fact that many physicians, who make a specialty of diseases of children, have resorted to intraperitoneal injections of various fluids to combat collapse, in the so-called acidosis of cholera infantum and to overcome the effects caused by loss of blood in the new-born, and in any other state characterized by an inability to retain and absorb fluid taken through the mouth. It will be recalled that the method consists in introducing a hollow needle through the abdominal wall about an inch below the navel, using ordinary precautions as to careful asepsis. Various fluids have been employed, most commonly normal salt solution, and the experience of those who have described this method most seems to have been favorable. The general consensus of opinion has been that such injections are harmless, that they often do good in desperate cases, and that the absorption of fluid from the peritoneal cavity is remarkably rapid. Until recently, however, little has been done by way of experimentation or scientific research to determine the actual rapidity of absorption, and also to decide whether any changes were produced in the peritoneum which could in any way be considered harmful.

Manifestly the absorption of fluid from the peritoneal cavity must vary in its rapidity very greatly in different states and conditions. Where the tissues have been deprived of liquid by excessive purging and vomiting, it is conceivable that they will greedily take up an amount of fluid from the peritoneal cavity which will reëstablish as nearly as possible their normal condition, provided, of course, that the condition of collapse is not so far advanced that the circulation is too sluggish to permit of normal absorption processes. In conditions of intoxication, on the other hand, no such tissue thirst is present, and the fluid will not be absorbed with great rapidity for obvious reasons; being taken up in all probability no more rapidly than the skin and kidneys are capable of eliminating it. In some conditions, too, it is probable that if the kidneys are functionally inactive or actually diseased, there will be some danger of artificially drowning the patient, as for example when hypodermoclysis is freely resorted to in certain cases of nephritis when the kidneys cannot eliminate fluid.

Recently Denzer and Anderson, in the Children's Service of the New York Nursery and Children's Hospital, have made a further contribution to this interesting subject. It is not necessary to prescribe the technique of their work. The point which is of interest for the general practitioner is that they use the method of abdominal tapping not only for the purpose of introducing fluid into the peritoneal cavity, but also for the purpose of withdrawing fluid from that cavity in order to obtain cultures and to thereby get a clear conception of the pathological processes involving the intestines and peritoneum.

When they came to study the rapidity of absorption and the effects upon the peritoneum of the injection they found that there was considerable variation, and it may be said that their results do not indicate that the fluid is taken up as rapidly as many other clinical observers have been led to believe. Thus, as a result of their work, they seem inclined to think that complete absorption of injected fluid does not take place in less than twelve hours and often not for forty-eight hours.

Another point of very considerable interest readily overlooked, and yet one which is universally recognized by physiologists, is the question as to the relative rapidity of absorption of tonic, hypertonic, and hypotonic solutions. This is a matter of great importance, since in most of the instances in which intraperitoneal injections are to be resorted to a fairly rapid absorption of the fluid is desired. The average clinician is too prone to overlook the fact that a hypertonic saline solution tends to cause fluid to be poured out in order that it may be isotonic with the surrounding tissue, and that contrariwise a hypotonic solution should be fairly rapidly absorbed from the peritoneal cavity into the blood-vessels following the law governing osmosis.

These investigators do not seem to have

gotten very definite results when using hypotonic solutions in children, but in animals they point out that a hypotonic solution is more rapidly absorbed than a normal or hypertonic one.

It is equally manifest that pure water should not be used, and we would suggest that solutions in the neighborhood of 0.5, 0.6, or as low as 0.3 per cent be employed rather than the normal strength of 0.9 per cent.

Many years ago we pointed out that the crude method of using common salt in the proportion of a teaspoonful to a pint of water, while it may be satisfactory for irrigation purposes, is too inaccurate for intravenous or intraperitoneal injection, if the salt is not accurately measured. Again, sodium chloride is the only ingredient, whereas blood serum contains other salines. As a rule so-called "concentrated sterile saline," already prepared for further dilution by sterile water, should be employed and reduced to the strength that we have named for intraperitoneal injection by using a slight excess of water over and above the strength commonly employed for intravenous injection.

Finally, a word may be said in regard to the effect of such injections upon the peritoneum. These investigators found that a temporary reaction was induced, or what they call a sterile inflammation, but this sterile inflammation did not seem to be followed by any evil effects, as indicated by any symptoms which could be observed clinically or by a study of the cells obtained from the abdominal cavity by paracentesis.

THE VALUE OF IRON IN SECONDARY ANEMIA.

We presume that there are few points in therapeutics which are more definitely settled in the mind of the laity and in the mind of physicians than that iron is a valuable remedy in secondary anemias, and in all probability many medical men believe that it is a useful adjunct to arsenic in the treatment of primary anemias. There have been many papers published within comparatively recent times which have seemed to put this clinical estimation of its value upon a scientific basis, as, for example, the researches of Hamburger, Gottlieb, Muller, Jacobi, Stockman, and others. It has been recognized by some that the large doses of iron frequently administered are unnecessary since the total quantity of iron in the human body is very small, and in the large doses which are commonly employed, nine or ten grains a day, an amount is soon ingested which is equal to the body content.

It has also been recognized that in chlorosis, which is now classified by most hematologists as a primary anemia, large doses of iron are essential for reasons which are not clear, although it has been thought that in many cases of chlorosis most of the iron ingested is changed into a sulphide of iron by the sulphuretted hydrogen in the bowel which is present in excess when there is constipation.

Our attention has been called to this matter again by an investigation recently reported in the *Archives of Internal Medicine* by Whipple and Robscheit, who produced a secondary anemia in dogs by bleeding, and then carried out a very exhaustive study as to the influence of various preparations of iron in the regeneration of the blood. The conclusions which they have reached are startling, and if true as to human beings must very considerably modify our opinion of the value of this standard remedy. Most of our readers will be somewhat taken aback when they learn that these investigators claim that their experiments give no support to the time-honored custom of administering iron and certain other drugs in conditions of simple anemia, and that the burden of the proof now rests with those who claim that any given drug is potent under such conditions. They do not deny that patients who are taking iron and arsenic improve, but apparently their point of view is that the improvement is chiefly due to dietetic conditions rather than to the drugs which are swallowed.

We have here a research which deserves attention because of the extreme care exercised by these investigators in regard to

the elimination of factors of error, and we also have here an illustration of how scientific ardor may lead investigators to ignore certain facts which do not seem to them to be based on scientific investigation, but which nevertheless seem assured as the result of clinical experience.

We have often pointed out that pharmacological investigations on animals are of the greatest possible value in that they increase our general knowledge and often correct error, but at the same time we have protested against the laboratory investigator lightly brushing away the experience of thousands of clinicians after making a few experiments upon animals, not that the results obtained are valueless or lacking in interest, but because the two sides of the evidence have not been adequately considered.

It has always seemed to us that where a research such as this seems to destroy preconceived ideas, it is well for the investigator to publish his results, and then not to deny the correctness of clinical opinion, but before deliberately stating that a drug is useless it would be well if he went further and tried to adjust the apparent discrepancy between the results that he has obtained and those obtained by his clinical confrères. To illustrate what we mean it will be recalled that every research which has been made upon the influence of calomel upon the flow of bile in human beings and in dogs, or other animals, has seemed to indicate that it is entirely devoid of power over the liver, and yet we presume that, here again, the medical profession has a deeply seated conviction that calomel is a hepatic stimulant. It may be true that it does not act in the way which it has been supposed to act. Under these circumstances it is up to the laboratory investigator to find out how the clinician gets the results which undoubtedly accrue rather than to make the *ex cathedra* statement that calomel is of no value in hepatic torpor. We mention these facts because they have a direct bearing upon the research which we are discussing.

Admitting the accuracy of the method employed by the investigators that we have quoted, we nevertheless are not prepared to accept their accuracy as to secondary anemia in human beings because it seems scarcely credible that thousands of physicians could have administered iron for generations and have been utterly mistaken in their belief that it is valuable when properly employed.

What the clinician needs is not alone investigations which seem to disprove the value of things in which he has confidence, but investigations which go far enough to not only correct him, but to explain matters which are obscure, and, in addition, at least offer a substitute for the remedy which has been claimed to be without value.

If we had not thought this research accurate we would not have called attention to it. The point of doubt that is in our mind is whether the conditions represented in the animals used are identical with the conditions that exist in human beings, and we confess that until still more evidence is adduced we shall continue to believe with many of our colleagues that iron is a useful drug in secondary anemia.

CONJUGAL NEUROSYPHILIS.

There is an accumulating but not convincing evidence based on certain clinical data which strongly suggest the incidence of a neurotrophic strain of the Spirochæta pallida. Part of this evidence is based on the comparative frequency of neurosyphilis in both partners to a marriage and in their children. This phase of the question is considered by Moore and Keidel *(Journal of the American Medical Association,* July 2, 1921), who publish the results of their examination of the marital partners of fifty neurosyphilitic patients. Fifty-two partners (forty-two wives, two mistresses, and eight husbands) were examined by the physical and serologic methods, these including a careful anamnesis, physical and neurological examination and investigation of the Wassermann reaction of the blood and of the histobiology of the cerebrospinal fluid. In

most instances both the neurosyphilitic patient and his partner were examined personally.

The incidence of neurosyphilis in an unselected class of untreated or badly treated syphilitic patients is probably between 25 per cent (Mattauschek and Pilz, from clinical observations), and 35.7 per cent (Wile and Marshall, based on 1869 spinal punctures on patients in all stages of syphilis, including 349 neurosyphilitics). In a large number of syphilitics without definite neurologic involvement, subjected to an amount of treatment known to be insufficient to cure, it was found to be from 12 to 16 per cent. Of the forty partners of this study demonstrated to have syphilis, fifteen had had one or more courses of treatment before spinal puncture was performed; so that the expectation of neurosyphilis in this group of patients might fairly be put somewhere between 15 and 35.7 per cent. Actually, however, 52.5 per cent were neurosyphilitic. This may be considered as evidence in favor of a special strain of infecting organism with a predilection for invasion of nervous tissue. Complicating factors arise, however, when these patients are divided into the two groups of partners of parenchymatous neurosyphilitics (tabes and paresis) and those married to neurosyphilitics of the cerebrospinal (meningovascular) type. Of twenty-two syphilitic partners of the first group, fifteen, or 67.2 per cent, had neurosyphilis. This incidence seems far too high to be coincidental; but of eighteen partners of the second group, only six, or 33.3 per cent, were neurosyphilitic, which is not materially greater than the expected incidence of neurosyphilitics in any group. As already pointed out, furthermore, the duration of marriage and of syphilis in the syphilifer is about twice as long in the combined groups of parenchymatous neurosyphilis as in the group of cerebrospinal syphilis. An attempt to employ this fact to explain the discrepancy of neurosyphilis in the partners in the two groups conflicts with our present-day theories regarding the genesis of neurosyphilis. So far as we now know, the central nervous system is invaded early in the course of the disease, probably at the time of the first period of generalization, and, except under unusual circumstances, not at any other time. It is therefore not permissible to argue that if the nervous system has not been invaded by the ninth year after marriage, invasion may yet take place before the sixteenth year, and thus bring the incidence of conjugal neurosyphilis in the group of meningovascular syphilitics equal to that of the parenchymatous group.

A further essential point in the argument of the supporters of the neurotropic strain theory lies in the comparative infrequency of symptoms of early syphilis in patients with neurosyphilis, and especially parenchymatous neurosyphilis. This infrequency is well illustrated in the present series in the syphilitic partners of tabetics and paretics; but two-thirds of the partners of cerebrospinal syphilitics had passed through the usual course of early syphilis.

If the scientific value of this material, so far as it permits a division of the organism of syphilis into distinct strains, is inconclusive, the practical value of the work is nevertheless obvious. The slogan introduced by Solomon, "The family of a paretic is the family of a syphilitic," receives ample support. It is as much the duty of every physician who deals with neurosyphilis to investigate the families of his patients as it is that of the physician who treats early syphilis. Furthermore, the seven spouses in this series with asymptomatic neurosyphilis demonstrate that such an investigation must be complete. Unless it includes anamnesis, physical and neurologic examination, and the usual laboratory tests of the blood and spinal fluid, it is inadequate.

Moore (*Archieves of Dermatology and Syphilology*, Vol. 4, No. 1, 1921) observes that invasion of the central nervous system takes place in 35 per cent of all syphilitic patients at the time of the first generalization of the disease. The theory has gained some acceptance that neurosyphilis of whatever type practically always originates in

the first few months of the infection. He divides early syphilis into two groups: a group comprising from 20 to 35 per cent of all cases in which neurologic invasion takes place at the time of, or before the appearance of, secondary manifestations; and the remaining 65 to 80 per cent in which no such invasion can be demonstrated. Evidence is rapidly accumulating to permit a division of the first group into three subgroups on the basis of response to antisyphilitic treatment, namely, a small proportion who spontaneously deal with the neurologic infection; a fairly large proportion, perhaps about one-half, who are rapidly brought to a serologic normal by routine treatment; and the remainder, whose asymptomatic neurosyphilis is eradicated only with the utmost difficulty, and who probably represent the class of future parenchymatous neurosyphilitics.

The importance of a clear conception of the time of origin of neurosyphilis is at once apparent when the relations of the disease process to treatment are considered. Does invasion of the central nervous system always take place within the first few months of the infection? If not, may it occur at any time, or only under special late circumstances? If one adheres to the theory that all neurologic infections are early, and may be detected during their asymptomatic stage by the simple procedure of spinal puncture, it would appear feasible to eradicate neurosyphilis almost completely by means of adequate, intelligent treatment. Furthermore, if a negative spinal fluid examination rules out the possibility of the later development of neurosyphilis, it is unnecessary to repeat lumbar puncture, and the patient may be dismissed with the positive assurance that he need not fear tabes or paresis.

If, on the other hand, it can be demonstrated that a patient in whom early neurologic signs were absent and whose cerebrospinal fluid examination was negative later did develop neurosyphilis, and if it can be further shown that this contingency may arise under certain definite circumstances, it may be possible to predict the necessity for repetition of lumbar puncture. The development of late neurosyphilis might be determined in two ways: by the appearance of clinical signs of neurologic involvement, and by the demonstration of positive cytobiologic changes later in the course of the disease.

Moore summarizes the result of his study as follows:

In fifty-four cases of syphilis in all stages of the disease, but without demonstrable neurologic involvement, an early negative spinal puncture was repeated, with positive results in two.

In one of the positive cases, invasion of the central nervous system had apparently taken place by direct extension from a gummatous periostitis of the inner cranial table; in the other, it probably occurred during a second period of generalization of the disease.

In the majority of cases of neurosyphilis, invasion of the central nervous system takes place during the first few months of the infection; but in some cases it may occur at any time during the course of syphilis by one of the two mechanisms outlined.

The appearance of recurrent secondary syphilis or the recurrence of a positive blood Wassermann reaction after a lapse in treatment is the probable outward manifestation of a fresh generalization of the disease, and should be made the occasion for reëxamination of the cerebrospinal fluid.

THE TREATMENT OF SURGICAL AFFECTIONS BY LIGHT AND HEAT.

He who reads his journals and he who travels widely will be struck by the occasionally printed articles and occasional clinical demonstrations of the beneficial effect of light and heat upon a variety of pathological conditions. Perhaps these therapeutic agencies are most largely used and therefore have most conclusively proven their value in the treatment of chronic infections, and particularly those incident to the tubercle bacillus. Heliotherapy, applied

locally and under the direction of an enthusiast, to whom time is no object, has produced results which have even made the aggressive surgeon lay aside his knife. There is in such treatment, so directed, a strong psychic element, but in addition to this light and heat produce vascular changes which are important factors in restoration to normal.

It is to be remembered that during the war and in certain services it became the fashion to treat every wound by placing near it an electric light. The custom was never wide-spread and perhaps may not be continued now in a single hospital, but during the endemic of this practice there were a number of clear-headed, experienced surgeons who believed, and openly stated, that they had added to their armamentarium a potent means of overcoming infection and hastening wound healing.

The successful use of the Finsen light in curing lupus and the value of sun-baths in tuberculosis are attested by thousands of cases. Because of the undoubted benefit accruing from its use, the electric light cabinet, excepting for its bulk and its expense, would vie in popularity with the hot-water bottle The so-called leucodescent lamp is almost a part of the household furniture in those families troubled by what they term rheumatism; nor have the activities of the dentists entirely abolished this source of enjoyment and comfort.

Hirsch (*Urologic and Cutaneous Review,* August, 1921) is well content with the effects produced upon an acute epididymitis by the light and heat treatment. He says: "Let us suppose the patient is before us with a most tender, swollen epididymis, seeking solace. He is first shown how to apply the broad, supporting adhesive strip. To save time Hirsch has found it expedient to have a photograph with the scrotum resting upon the adhesive strip and show it to the patient. This forms a definite picture within the patient's mind and much time is saved in the tedious process of description. The patient is then told to go home and get into bed and support the scrotum. Later the physician calls with the therapeutic lamp, which is suspended from the chandelier, or a string is run from the foot to the head of the bed and the lamp cord is tied to the suspension line at the correct point. Four or more thicknesses of gauze are wrung out in hot saturated magnesium sulphate solution and applied to the testicles. To start with, the lamp is so regulated that the heat is quite hot, although never warmer than the patient can comfortably tolerate, there being no advantage in burning the patient. A 100-watt blue nitrogen bulb is screwed into the socket of the reflector, which is placed one and one-half to two and one-half inches distant from the scrotum, depending upon the tolerance of the patient, the amount of heat supplied, the thickness of and the amount of moisture on the gauze dressings. The light rays have an unquestioned value, for those who have worked with this method will note that after the use of the electric pad, which supplies only dry heat, the effect cannot be compared with the therapeutic lamp."

It is worthy of note that one of America's most distinguished surgeons, who had suffered anguish from an infected arm, was relieved of his pain in a few minutes by heat and light applied through an electric lamp, and remains to this day a firm believer in the efficiency of the method.

Progress in Therapeutics

Medical Therapeutics

Treatment of Dysentery with Emetine.

In the *Journal of the Royal Army Medical Corps* for June, 1921, JEPPS states that emetine is highly toxic to man and other animals, and as it is necessary for the removal of infection of *E. histolytica* to employ the drug in doses of such size that there is in many cases a slight, and in some a severe, toxic effect on the patient, it is important to bear this in mind when considering the results of emetine treatment. In spite of the many series of results now published, in none of which is there any record of more than temporary ill-effects—the drug always being taken under close medical supervision and stopped when considered advisable by the medical attendant—there still seems to be a strong feeling in the minds of some against its use in any circumstances.

It does not appear superfluous, therefore, to give in some detail the observations made from this point of view on the present series of cases.

The patients having emetine hydrochloride injections were never troubled with vomiting or nausea, and no special arrangements were necessary in their case. One daily injection of one grain was given in the morning.

Those undergoing treatment with the emetine-bismuth-iodide mixture, on the other hand, profited by adherence to the following routine: They were not kept in bed; but were always kept on a very light diet during the whole course of treatment. The diet consisted of milk, bovril, fish without vegetables, bread and butter, and two eggs daily. After the men were in bed at night they received ten minims of chlorodyne, and half an hour later the dose of emetine-bismuth-iodide mixture in water. They were allowed to have hot tea afterward if they wished. In this way the vomiting and general discomfort were reduced to a minimum. Vomiting did occasionally take place, especially after the first few doses of a course, but the treatment never had to be abandoned on that account, as it was never serious. In one or two cases in which the first few doses had rather troublesome effects the treatment was stopped and begun again a few days later, with good results. Most of the patients had more or less diarrhea whilst under treatment. In some cases the patients had a saline or quinine wash-out daily for a week during the treatment; especially some with a raised temperature (to 100° or 101° F.). There were never any heart symptoms, excepting in one patient who complained of faintness, and pain in the region of his heart. It transpired that he had studied a little medicine, and thought he was being given chloral before the mixture. On his being reassured that it was chlorodyne, his symptoms completely disappeared. From the beginning of treatment the stools assumed a better character, and the condition of the patients themselves was much better after the twelve or twenty-four days of treatment. They all put on flesh, and their color and appetite improved.

In the whole series of treatments with emetine-bismuth-iodide mixture (seventy-five cases) the course had only to be stopped on account of serious diarrhea, and in one because the patient had a high temperature which was not attributed to any other cause. The amount of vomiting is dependent to a large extent on the conditions in the ward; a nervous or troublesome patient may easily upset several others, and tactful supervision may do a great deal toward preventing it.

The following conclusions are reached:

1. Salol-coated pills of emetine-bismuth-

iodide proved unsatisfactory; 45.1 per cent (at least) of twenty-six cases relapsed after a twelve-day course of thirty-six grains.

2. An emulsion of emetine-bismuth-iodide in liquid paraffin gave much better results. Of sixty-three cases given a twelve days' course of thirty-six grains only 12.7 per cent relapsed. After retreatment of a few of these relapsed cases with a double course, 11.1 per cent were still uncured.

3. Further analysis of these figures shows that of fifty-seven cases showing no intestinal symptoms, or only slight symptoms, 3.5 per cent had not been cured; while of six acute and subacute cases five, or 83.3 per cent, had remained positive.

4. Injections of emetine hydrochloride were found very useful in cases where the emetine-bismuth-iodide treatment could not be tolerated. Three out of five cases were cured by a course of twelve daily injections of one grain each.

5. The treatment proved beneficial to the patients' general condition; and there were no permanent ill effects.

Treatment of the Toxemia of Early and Late Pregnancy.

In the *Journal of the American Medical Association* of June 25, 1921, DAVIS states that the toxemia of late pregnancy is usually supposed to occur after the formation of the placenta and at least the period of viability. It may or may not be accompanied by convulsions. When these are absent, acute pain in the epigastrium, nausea and vomiting, violent headache, and sometimes disturbance of vision may precede convulsions. In this condition the presence of the fetus may become a complication, if there be a strong desire on the part of the mother to obtain a living child. Sometimes fear that a method of treatment may injure the child is an obstacle in the management of these cases. On the other hand, the statement that treatment will protect the child may assist greatly.

These are emphatically cases for hospital care. Symptoms of toxemia should be recognized, if possible, and alarm be taken before the convulsions begin. On admission to the hospital, unless there is some unusual complication, bleeding and transfusion should immediately be done. Anesthesia is to be avoided, and local anesthesia can readily be employed before opening a vein. This should be followed by irrigation of the stomach and the leaving in the stomach of from one to two and a half grains of calomel, with sodium bicarbonate. The bowels should be thoroughly irrigated with hot sodium bicarbonate solution. The patient should be catheterized, and the urine examined. The blood obtained should be examined for blood urea, and a record kept of the findings and of the quantity of urine obtained by catheter. It is well to place the patient between blankets, and, if the skin does not act promptly, dry heat may be introduced beneath the blankets. Wet packs should be avoided, as they are depressing and tend to produce pulmonary edema.

The question of the employment of narcotics will at once arise. Their use will depend on the degree of nervous irritation present, and also on the extent to which the patient is unconscious. It is well to begin eliminative treatment first, for very often it will act as a sedative. If, however, there is evidence that the nervous system is suffering from the condition, then morphine, hypodermically, is indicated. If there is a tendency to bronchial catarrh, atropine also should be given, and if the action of the heart is greatly disturbed, digitalin may be added.

A vaginal examination is unnecessary at first, and is far less important than the treatment to secure elimination. When, however, this has been given, such examination should be made, the condition of the cervix being noted, and also the presentation and the position.

The old discussion as to whether these patients should be treated by the immediate emptying of the uterus still prevails. Davis does not believe that the immediate emptying of the uterus is indicated. Such a procedure does not invariably cause convulsions to cease, nor does it in the severest

cases, and in many others, materially improve the condition of the patient. There can be no question that labor is an irritation and may increase convulsions, and if the patient is in labor and labor is developing naturally, it should be expedited in the manner which will cause least disturbance and traumatism to the patient. In multiparous women, if the cervix is partially softened and dilated, the membranes may be ruptured. Labor will then proceed more actively, probably accompanied by the development of an increase in convulsions.

There is one exception to be made to the statement that the emptying of the uterus is not indicated in the toxemia of late pregnancy. When, in a primipara, the fetus is in good condition, the cervix unshortened, unsoftened, undilated, convulsions appearing or threatening, and the whole condition has arisen suddenly, immediate delivery by abdominal Cæsarian section is indicated, provided the fetus is at least viable, and preferably near term.

Another point of importance is the question of the necessity for absolutely preventing or limiting convulsions. If the convulsions were the important element in the case, then a patient who had the greatest number of convulsions would be most liable to die; but accurate and extensive observation shows that this is not true. A woman may die in the toxemia of late pregnancy without a convulsion, and others may survive from fifty to a hundred. Convulsions sometimes produce a favorable effect on the case; for they are followed by increased secretion, action of the skin and sometimes of the bowels, and in some cases the development of labor during convulsions seems to have favorable influence.

Four hours after the first eliminative treatment is given, intestinal irrigation should be repeated, and glucose and sodium bicarbonate solution should be left within the bowel for absorption. If there has been vomiting, the stomach should again be irrigated and magnesium sulphate in solution left within. The general condition of the patient as regards excitability and the state of the circulation should be observed, and such medication given hypodermically as seems indicated.

Under such treatment the patient will grow better or worse. The occurrence of labor is also a third possibility. If the patient grows better, the bowels will act freely, the secretion of urine will be increased, and the blood-pressure will become less, if it has been excessive, and will become greater, if it has been deficient. The disturbance of the nervous system will subside and the patient will usually complain of thirst and sometimes of hunger. Milk and water, equal parts, may be given in small quantities as often as the patient will take it. The use of blankets to promote the action of the skin and irrigation of the intestine should be continued, the intervals of intestinal irrigation being gradually lengthened. No solid food should be given until the organs of elimination have acted thoroughly and the patient's general condition indicates the ability to digest food.

Defects in Obstetric Teaching.

In the *Journal of the American Medical Association* of June 25, 1921, POLAK states that the average graduate has been drilled in mensuration, abdominal diagnosis, watching the progress of normal labor, auscultation of the fetal heart, and in aseptic technique. He is a fair male midwife, nothing more. He is capable of delivering a multipara with an ample pelvis, and this he can safely do provided he is conscientious in his asepsis. If he is not, the woman is far safer to be confined without the presence of a physician than to have one who introduces bacteria from without.

Another reason why infection and invalidism follow so frequently in the train of parturition is an apparent lack on the part of the practitioner, as well as on the part of some specialists, of an appreciation of the actual physiology of pregnancy and the several stages of labor. This whole process has been fortified by every factor that nature can place there to prevent sepsis and to accomplish delivery without injury

to the child or the material soft parts; yet failure to observe the steps of this physiological process is of daily occurrence.

Certain obstetric truths cannot be too often repeated; hence, with the full knowledge that he is making statements that are known to all, Polak shows how nature has fortified the individual against infection in the normal course of labor.

First, the secretions of the normal pregnant woman are antagonistic to pathogenic bacteria, and during the latter weeks of pregnancy and until labor has actually begun, there is a tenacious plug of mucus in the cervix which stands as a barrier between the infective portion of the vagina and cervix and the sterile uterine cavity. Not until labor actually begins is this plug passed, and then the membranes become the barrier to invasion from below. The membranes have another function, and that is their hydrostatic action, which not only protects the child from uterine compression, but effaces, obliterates and dilates the cervix by a series of equable pressures which minimize the trauma to which this part of the uterus must be subjected. Only by their preservation can the integrity of the cervix be preserved and trauma minimized, which insures better tissue resistance; later, as the membranes rupture and the liquor amnii escapes, it carries with it and before it the bacteria which have reached the portico and entered the cervical canal. After the cervix has become sufficiently dilated to permit the passage of the child, the fetus comes through the cervicovaginal canal, pushing everything before it, practically scrubbing the surface as it goes. The escape of the fetus is followed by a gush of hind-waters which further washes the canal from above downward, and this in turn is followed by the separation and expulsion of the placenta, which turns itself inside out through the ruptured membranes, thus keeping everything clean behind it. Furthermore, nature has added the protection of a bactericidal quality to the lochia, during the first twenty-four hours postpartum, while the uterus is contracting and retracting and closing the uterine sinuses.

No one can study these physiologic processes without being impressed with the natural precautions which are afforded the woman against infection from without. Yet practitioners feel that they can anticipate these normal processes—artificially dilate the cervix, prematurely rupture the membranes, traumatize the soft parts, expedite labor by forceps or version, reduce the natural resistance, and carry bacteria from the unsterile into the sterile zone without getting a resulting morbidity.

Every year some of our great teachers present and advocate before a body of specialists some method to shorten the process of labor, relatively safe in their hands but dangerous in the hands of those less skilled; for meddling in midwifery costs numberless lives. These suggestions appeal to the busy practitioner, yet were never intended for his practice. The time to recognize abnormalities, disproportions and complications is before they occur, in order that proper preventive treatment can be instituted.

The surgeon does not open the abdomen with a jack-knife which he takes out of his pocket: he prepares his field of operation, his instruments and his hands. He takes care to repair the damage he has done by controlling his hemorrhage, coaptating the edges of his wound because the quality of his work is judged by the result which the patient can see; but so far as Polak's investigation has gone, no obstetric condition is so formidable that the practitioner will not make a try at it at least. This is because he has not been taught, and the public has not as yet recognized, that obstetrics is a specialty—that the obstetrician must be an obstetric surgeon, who has had a training in the fundamentals of the science and the art of obstetrics, general and special diagnosis, and an appreciation of the principles underlying obstetric surgery. To entitle him to be considered as a specialist he has to produce a living child which has a reasonable certainty of life, and a mother who recovers without morbidity, and is restored functionally and anatomically to as perfect a state as she was in before she was delivered.

Volume Changes of the Cerebrospinal Fluid After Adrenalin, Pituitrin, Pilocarpine, and Atropine.

In the *American Journal of Physiology* for June, 1921, BECHT and GUNNAR make the following statements:

1. A method is described for measuring and recording graphically the amount of fluid in the skull under slightly less than the normal pressure.

2. Adrenalin does not increase fluid formation, because by this method it can be shown that the fluid flows out of the canal during the pressor stage of the action, but returns in equal amount while vascular readjustment is taking place.

3. In the same way it can be shown that pituitrin does not increase fluid formation.

4. In the same way it can be shown that pilocarpine does not increase fluid formation.

5. Atropine following pilocarpine may—but by no means always—produce increased arterial and venous pressure, accompanied by an increase in the amount of fluid forced into the bottle. The return of this fluid may be slow and tedious, but finally takes place. It is believed that this also is a purely mechancal change not accompaned by new formation.

Dermatitis and Allied Reactions Following the Arsenical Treatment of Syphilis.

In the *Archives of Internal Medicine* for June, 1921, MOORE and KEIDEL in summarizing their article on this subject state:

1. They have presented a study of twenty-three cases of dermatitis and allied reactions following the use of arsenical products in the treatment of syphilis.

2. Such reactions are equally frequent in either sex, but they are about three times as liable to occur in the white race as in the colored.

3. Evidence is presented that the lesions of syphilis or the duration of the disease exercise no modifying influence upon the incidence of dermatitis. Two of their twenty-three cases occurred in patients in whom syphilis could be ruled out.

4. Dermatitis has been observed by them to follow all chemotherapeutic arsenic compounds which they have employed in the treatment of syphilis.

5. In the majority of cases in their series, arsenic was the only drug employed, so that mercury and potassium iodide as causative factors can be excluded.

6. Reactions of this group tend to appear early in the course of treatment.

7. In some cases certain prodromal symptoms may be recognized. These consist of itching, mild or fleeting macular, maculopapular, or vesicular skin eruptions, stomatitis, prolonged fever, or marked malaise. The occurrence of any of these during the use of arsenical products should lead to a suspension of treatment and a general survey of the patient.

8. Dosage, technique of administration, and impurities in the drug can be excluded as etiologic factors.

9. The lesions may be classified, on the basis of the constitutional manifestations and their importance, as mild or severe. In the mild group fall urticarial, erythematous, and herpetic rashes. In the severe group are the macular, maculopapular, and exfoliative rashes, itching, and stomatitis.

10. Urticaria is fairly common in association with the nitritoid crisis. The more severe constitutional manifestations are absent, and in most cases arsenical treatment may be continued. No patient so treated has later developed a more serious rash. The same may be said of herpes simplex and the erythematous rashes, except that in these cases fever and leucocytosis are frequently found.

11. The characteristics of the rashes of the severe group are described. Attention is drawn to characteristic alterations in the blood picture, which were present in fourteen of sixteen cases studied. The changes consist in general of leukopenia, decrease in polymorphonuclear neutrophiles, eosinophilia, increase of the large mononuclear-transitional group, and the appearance of many fragile cells.

12. The complications of dermatitis exfoliativa, including acute nephritis, polyneuritis, jaundice, skin infection, bronchopneumonia, and septicemia, are discussed.

13. Attention is directed to the possible relation between the complications due to infection and the disturbance of hematopoiesis.

14. The sensitiveness of the patient to the drug causing the original reaction persists over long periods of time and is made manifest by even small doses of the same drug. However, certain patients, who cannot be accurately distinguished, are able to take other less toxic arsenical drugs without the development of reactions of this type.

15. The prognosis of these reactions is grave. Among their series of twenty-three patients there have been five deaths. The pathological picture is briefly described.

16. Patients with itching without skin lesions, and with stomatitis due to arsenical preparations, have been found to present a blood picture similar to that described in the exfoliative dermatitis group.

17. The literature is reviewed, and the possible etiologic factors in reactions of this group are discussed. The evidence is in favor of their anaphylactic origin.

The Oral Administration of Pituitary Extract.

In the *Proceedings of the Royal Society of Medicine* for June, 1921, HAMILL states that the dosage he usually employed was 0.5 to 1 Cc. of pituitary extract for animals of 3.5 to 4.5 kilos, corresponding to doses of the order of 10 Cc. in the human subject. Such doses are large, but are desirable in a general investigation. Much smaller doses, corresponding to about 3 Cc. for the human subject, have produced definite strong uterine contractions within half an hour.

Some observations on the human subject in delayed involution of the uterus have shown a diminution of blood loss whilst pituitary extract was administered, and recurrence when it was withheld. With doses of 1 Cc. three times daily, nausea, retching and slight generalized colicky pains have been produced. These symptoms appear to correspond to the intestinal contractions and vomiting described. Attention has been called to these symptoms in man by other observers.

Animal experiments prove that pituitary extract adminstered by the mouth causes the characteristic uterine contractions.

Absorption takes place from the stomach and is more rapid when the stomach is full and actively digesting.

Large doses produce colicky contractions of the intestine and vomiting.

Clinical evidence harmonizes closely with animal experiment.

In view of the rapid absorption from the stomach and the fact that the intestinal juices rapidly destroy the active principle, it appears preferable that pituitary extract should be administered in solution and after meals.

Silver Arsphenamine.

The *Journal of Laboratory and Clinical Medicine* for June, 1921, in an editorial on this subject states that for some time accounts have appeared in medical literature of a new arsenic preparation used in the treatment of syphilis. This has been called "silver salvarsan," or more precisely the sodium salt of silver-diaminodihydroxyarsenobenzene, and it contains approximately 22.5 per cent of arsenic and 14 per cent of silver. It is presumed that the silver for which spirochetes have an especial affinity serves as an anchor for the arsenic, and that therefore the drug, despite its lower arsenic content than arsphenamine, is more active therapeutically.

Animal experimentation seems to show that silver salvarsan is twice as effective as the old salvarsan (606) and three times as effective as neosalvarsan (914). Kolle states that silver salvarsan is old salvarsan in active form plus silver, and that 0.25 silver salvarsan is the equivalent of 0.4 of old salvarsan.

Dreyfus in discussing his experience with this drug in the treatment of syphilis of

the nervous system says that silver salvarsan is three times as efficacious as the old salvarsan, that it acts more quickly, its toxic dose is higher, and it has the advantage of a combined silver and arsenic effect. He says that in nervous syphilis the indications are that the new preparation promises to be more valuable than the older ones, even when the latter are used in conjunction with mercury. It is Dreyfus's experience that, especially in early cases, both subjective and objective symptoms show marked signs of retrogression within two weeks. More care is necessary in tabes than in other conditions, but in all small doses with carefully graduated increases are used.

Boas and Kissmeyer, after treating 62 cases representing all stages of syphilis, and using mercury with it, found that silver salvarsan was just as effective as old salvarsan, and in addition it was more soluble and easier to handle. They prefer it for these reasons only. Körsbjerg on the other hand is very enthusiastic over the new drug and has been so impressed by its effects that neither he, nor his chief Jersild, uses mercury either as an accompaniment or as a follow-up treatment. There were 32 cases in the series reported, of which 19 were secondary. In every case all symptoms had vanished within two weeks of the first injection.

The use of this silver-arsenic preparation seems from the reports to be attended by more danger than the older preparation. This danger is reflected in the dosages used —*i. e.*, from 0.02 to a maximum of 0.25, in dilute solution. Anaphylactoid symptoms—redness and swelling of the face and buccal mucous membrane; pyrexia; cutaneous eruptions which are usually transient, and occasionally severe dermatitis; syncope, collapse, vomiting, vertigo and headache, and icterus are all listed as secondary effects.

Neurorecurrences seem from reports to be fewer after silver salvarsan than after the older drugs, but the cases are too few to be decisive.

A large series of cases treated with silver salvarsan is that of Behring, who reports upon his experience in giving 3200 injections in 259 cases. In this series icterus occurred nine times, and angioneurotic symptoms six times. There was one death. In his experience no venous thrombosis occurred. Eruptions and icterus were not more commonly observed after silver salvarsan than after the older preparations. Silver salvarsan is well adapted to the abortive treatment of syphilis. Behring says that a definite verdict cannot as yet be given with reference to tabes and central syphilis, although tabes is apparently favorably influenced.

Wiener says that the curative effects in primary lesions, secondary and tertiary symptoms are very favorable and apparently not inferior to the results of a combined course of neosalvarsan and mercury in the customary dose.

The most recent report on this silver-arsphenamine is based upon the experience of Major Watson of the Medical Corps, U. S. A., and has to do with the treatment of 800 patinets, and more than 6000 injections. The method of treatment recommended by the Board of Medical Officers, and the method used by Watson, was as follows:

An interval of seven days between each dose in each course of treatment. Treatment to consist of four courses of silver salvarsan and gray oil.

In the first course of treatment the first dose to be fifteen hundredths (0.15) gm. of the drug. The second dose to be two-tenths (0.2) gm., and each of the remaining five doses of the course to be three-tenths (0.3) gm. of the drug.

At the end of the first course of treatment a Wassermann blood test is made and then thirty days' rest.

In the second course of treatment three-tenths (0.3) gm. of the drug is given at each of seven injections, at seven-day intervals, and is followed by two and one-half months' rest.

The third and fourth courses are the same as the second, with ninety days' interval between the two. Gray oil is used in conjunction with and at the same time as each injection of silver salvarsan, using eight hun-

dredths (0.08) gm., by intramuscular injection.

A blood Wassermann is recommended after each course and a spinal fluid Wassermann after the second.

Such is the army intensive treatment. As against it Hoffmann says that one complete intensive course of treatment with mercury and silver salvarsan in primary syphilis will give a complete cure. Hoffmann, Neisser and Scholz believe that if treatment can be commenced in the prepositive Wassermann stage the disease can be cured in from 80 to 100 per cent of the cases. Nevertheless it is to be borne in mind that all persons who have had syphilis, no matter how rapidly the clinical signs disappear, nor how soon the Wassermann reaction becomes negative, should be watched both for clinical and serologic recurrences.

It seems from a review of the literature that in silver-arsphenamine we have a more potent antispirocheticide than any heretofore in use, and one which should be used with the greatest care. It seems to represent a real therapeutic advance.

The Treatment of Acute Toxemia.

In the Correspondence columns of the *British Medical Journal* of June 4, 1921, REID in considering lobar pneumonia states that a portion of the lung is invaded by the pathogenic organisms; blood is extravasated; and that portion of the lung becomes more or less solid. The temperature rises, rigors occur, the patient suffers from headache, sleeplessness, and a general feeling of illness. The severity of the disease is not at all strictly proportionate to the amount of lung involved, but depends rather on a toxemia which especially affects the heart and breathing centers. In favorable cases a "crisis" occurs about the fifth to the tenth day. Commonly the patient sleeps, and awakes some time later feeling much improved. His temperature has fallen, his headache, rigors and sleeplessness have gone, and he is bathed in sweat. Apparently the condition of his lung has not altered; but later gradual resolution occurs, and the extravasated and disintegrated blood is voided as "rusty" sputum.

Sweating is nature's mode of cooling the healthy body by evaporation from the surface. But if, as usually happens in pneumonia, the patient is thickly covered with bedclothes and evaporation prevented, the temperature still falls. Presumably, therefore, something more than mere exudation and evaporation of fluid occurs in the crisis—something which in itself causes the fall of the temperature and the general improvement. He can conceive no reason for such a sudden change except a quick elimination of toxins, and in view of the lack of evidence of increased activity in other possible channels of elimination, he cannot conceive by what road the toxins can be passed out if not by the sweat. He knows of no evidence that toxins have been found in the sweat; but then, he says that he does not know that they have been sought there.

Since recovery from acute diseases is associated with a falling temperature, moisture of the skin, and sleep, the administration of antipyretics, sudorifics, and soporifics was formerly common. But the medicines and the dosage generally employed depressed the heart and breathing centers, and of late it has been regarded as almost axiomatic that antipyretics and sudorifics are injurious under such conditions.

But if we give a patient suffering from pneumonia, and not already poisoned past redemption, a dose containing aspirin 10 grains, phenacetin 5 grains, and pulv. ipecac. co. 5 grains, we get (as far as his experience goes) what has all the appearance of an artificial crisis, without depression of the heart and breathing centers, or any other ill effects. The patient soon falls asleep, and wakes up some hours later feeling much better, bathed in sweat, his temperature down, his rigors and headache gone, and his pulse and breathing improved. The signs of illness will gradually return, but they can be abolished in the same way once or twice a day till permanent improve-

ment sets in. On such occasions the patient will be relieved and rested, and, unless his experience has been unusual, his illness shortened.

The Action of Quinine on Pregnant and Non-pregnant Uterus in the Tropics.

FISHER, in the "Memoranda" columns of the *British Medical Journal* of June 18, 1921, states that in tropical countries some medical practitioners advise pregnant women to give up prophylactic doses of quinine as soon as pregnancy begins. The result is in many cases that chronic malaria causes severe anemia and abortions; should the mother go to full term the children are badly nourished and have to be artificially fed owing to the poverty of the mother's milk, and unless both are removed from tropical regions there is great danger of the loss of their lives.

As with some women 5 grains of quinine cause contractions of the pregnant uterus and sometimes hemorrhage, he advises that the 5-grain prophylactic dose be taken in two doses of 2½ grains morning and evening, and in his thirty-two years' experience in Central Africa (11th deg. S. lat.) he has never seen a case in which this has done any harm, and in nearly every case the 5 grains have kept the women free from active malaria until the confinement. Then as the vital powers of resisting disease are much lowered by the excessive fatigue of child-bearing, it is necessary to give 10 grains (in very small doses) a day for five or six days, as very often, if not given, a severe attack of malaria will delay recovery.

He has never found quinine to cause abortion. On the other hand, he has treated cases of abortion in native women (who do not take quinine), in which the frequent abortions were undoubtedly caused by chronic malaria, for when given the above prophylactic doses they were able to go to term and give birth to healthy living children.

With regard to the effect of quinine on the non-pregnant uterus, undoubtedly in a small percentage of cases it causes excessive and too frequent periods. Years ago he found that when 5-grain doses of quinine caused deafness or noises in the ears it was a sign that a smaller dose (3 grains) was sufficient as a prophylactic, and the majority of women under 120 pounds weight will, he thinks, find this smaller dose will keep them free from active malarial manifestations.

Recently he has treated this menorrhagia also as a sign that only smaller doses of quinine need be taken, and if the 5-grain prophylactic dose is necessary it should be taken in 2½-grain doses twice a day; the few cases treated, however, are not sufficient to lead him to any definite conclusions.

Treatment of Acute Methyl Alcohol Poisoning.

In the *Ohio State Medical Journal* for July, 1921, ISAACS states that various treatments have been recommended. These consist of stimulants, as caffeine, adrenalin, strychnine, digitalis, camphor, oxygen, pilocarpine, and also potassium iodide. Gettler and St. George suggest saline or sodium bicarbonate infusions and phlebotomy, with repeated gastric and rectal lavage. Fenton reports a case of blindness in which the patient recovered after the instillation of ethylmorphine hydrochloride (dionin) into the eyes. The patient was taking sodium bicarbonate freely by mouth. Harrop and Benedict report the recovery of a patient following 5-per-cent solution of sodium bicarbonate intravenously.

The plan of treatment is based on alkalinization and elimination. If the patient is not comatose, and is received within twelve hours after taking the wood alcohol, it is well to pass a stomach tube and wash out the contents with a 1- or 2-per-cent solution of sodium bicarbonate in warm water, as experience has shown that some of the alcohol is excreted into the stomach. Three or four ounces of a 50-per-cent solution of magnesium sulphate solution are then poured in through the tube and left in the stomach. Sometimes an hour or more after washing the patient will vomit a consider-

able amount of food débris having a marked odor of methyl alcohol. The patient is put to bed, kept warm if his temperature is low, and is given 3 grm. of sodium bicarbonate, with about 250 Cc. of water every two hours, for about six doses, being awakened for his medication if asleep. Sometimes a whiff or two of aromatic spirit of ammonia will serve to awaken the patient enough to make him swallow. The dose of bicarbonate may be doubled without apparent ill effects. After this the patient is given 3 grm. of sodium bicarbonate with a glass of water, three times a day, one hour before meals, until the symptoms have disappeared. A safe guide as to the dose is to keep the fresh urine alkaline to methyl red. Fluids are forced, and a liquid diet is given until the acute symptoms are over. Then the diet may be as varied as the patient wishes.

If the patient is comatose, or if the cyanosis is very marked, with respiration much depressed, it is well not to wash out the stomach at first. In this case, or if medication by mouth is not retained, 1000 Cc. of Fischer's sodium bicarbonate (0.37 per cent) sodium chloride (1.4 per cent) solution at 99° F. is given slowly intravenously. In case of any doubt, it has been his custom to give the intravenous injection. No ill effects have been noted. If there is time and there seems to be congestion of the venous circulation from embarrassment of the right side of the heart, it may be well to draw off from 100 to 300 Cc. of blood before giving the intravenous injection. Half may be given at one time, and the other half later. It has usually not been necessary to give a second intravenous injection on succeeding days. A spinal puncture may be made if there is much restlessness and if there are signs of cerebral compression. After Fischer's solution there appears to be a dehydration of the nervous tissue, with increase in spinal fluid. The breathing usually improves rapidly, the mental state clears, and in from six to twelve hours the cyanosis has virtually disappeared. There is rapid improvement in the eye signs, the blurring of vision disappearing in from twelve to twenty-four hours, or sometimes a slightly longer period. The abdominal tenderness soon disappears.

It is well for the patient to remain in bed until the cyanosis has disappeared and the mental confusion has cleared. The bowels should be kept open with magnesium sulphate. The average stay in the hospital was about five days, with treatment for two or three days. It is well to have the patient return at intervals to note whether or not there has been any permanent damage.

Conservative Tendencies in Modern Gynecologic Therapy.

EHRENFEST in the *Journal of the Missouri State Medical Association* for July, 1921, states that though information at present available concerning the rôle played by functional disturbances of the ovary, and probably of other endocrine glands, in the etiology of gynecologic anomalies is still decidedly limited in its scope, definite changes in the conception of the rationale of some of the usual operative and non-operative methods of treatment are necessary. First, curettage and the use of caustics on the endometrium, especially in the treatment of uterine hemorrhage, are hardly justifiable procedures. We realize now why these procedures so rarely have yielded a satisfactory result. Secondly, the empirically established effectiveness of certain therapeutic measures must be explained in a different manner. The relief of that most common of gynecologic symptoms, hemorrhage, is obtained only in so far as the operative or non-operative procedure reduces or eliminates abnormal stimulation of the ovaries, by reducing pressure (as in correction of malpositions), by stretching or breaking adhesions, and by reducing inflammatory irritation.

A third deduction might be reasonably drawn from this better understanding of the etiologic significance of disturbed ovarian function: It should be possible to counteract the effects of a deficiency of ovarian hormones by the administration of ovarian extract, or, in view of the assumed

interaction of the entire endocrine system, it should be possible to stimulate or retard, respectively, ovarian function, as required in the individual case, by the administration of hormones extracted from other endocrine glands, which are supposed to work as synergists or as antagonists of the ovaries.

He refrains from discussing adequately the complex problem of gynecologic organotherapy. Personally he acknowledges a certain value of some of the ovarian extracts in the satisfactory relief of certain symptoms and functional anomalies. He is convinced that our definite information in regard to interglandular reciprocity and harmony, synergistic and antagonistic activity, etc., as established by scientifically correct investigations, is far too limited to place gynecologic organotherapy on any definite basis. Those employing these extracts singly or in fantastic combinations should realize more clearly than they seem to that they are merely experimenting with substances which in some conditions at times seem effective. The fact should not be forgotten that all scientific experimental proof is still wanting that any one of the numberless commercial preparations on the market actually contains, and thus is capable of actually replacing, all the hormones normally supplied by the gland whose dysfunction in the individual case is held responsible for the existing pathology.

Fortunately, even the most enthusiastic organotherapists concede that endocrine dysfunction is not always the cause but occasionally only the result of impaired health or of a state of temporary debility. The gynecologist is well aware of this fact. He knows that the ovaries prove almost specifically sensitive in this respect. Secondary amenorrhea, the very obvious evidence of suppressed ovarian activity, is commonly observed in certain types of brain tumor, in tuberculosis often before the disease itself has become manifest, in diabetes, in cachectic patients, or in those recovering from typhoid or other debilitating diseases. From this point of view the importance and value of general hygienic-dietetic measures in the treatment of gynecologic functional anomalies can be better appreciated. It is noteworthy that in a recent work its author, probably the most extravagant enthusiast in gynecologic organotherapy, emphasizes the necessity of hygienic measures during the administration of the various combinations of organ extracts specifically required by the various gynecologic anomalies.

Treatment of Acute Cardiac Failure.

O'BRIEN in the *Boston Medical and Surgical Journal* of July 7, 1921, states that the treatment varies with particular conditions, and some hearts fail so quickly that no treatment can be given. He refers particularly to lesions diagnosed post mortem as embolic plugging of the pulmonary artery; an impaction of ball thrombus in a narrowed mitral orifice; in a rupture of heart wall; in rupture of an aneurism; complete heart block; convulsions in Stokes-Adams disease; and in auricular fibrillation. In passing, he says that the deaths by chloroform and electrocution are proven to be due to ventricular fibrillation.

Accepting the fact that "overload" is cause of attack, in most cases, all treatment must be based upon common sense, and removal of physical and mental strain is the first logical thing to do.

Rest is of greatest importance, and should be mentioned first, and be insisted upon. The plans and wishes of the patient must be disregarded, and, if symptoms are at all severe, absolute rest in bed is necessary. Failure to get satisfactory results is usually due to mismanagement of a case rather than to error in selection of the drug. Much of the praise and faith bestowed upon digitalis and allied drugs might well be given to thorough rest. While the patient should be permitted to assume that position which gives most comfort in bed, a semiprone position, or even an upright one, is advisable, and the use of a bed-rest should be insisted upon, to give greater comfort, and thus avoid the physical strain of frequently readjusting the pillows.

Diet, baths, graded exercises, etc., are

most important in the convalescent stage, and call for careful supervision on the part of the attending physician.

Drug treatment involves the personal equation, and one cannot be exact as to dosage, selection of drug, etc., on this account. The correct diagnosis and particular situation as regards sex, age, size, complications, etc., must be considered in each case.

Venesection is clearly indicated when the patient is greatly cyanosed, dyspneic, coughing, and raising bloody sputum. There is absolutely no danger in drawing off blood at this stage, and wonderful results often follow, as drugs certainly are made more active thereby.

Morphine, best combined with atropine, to relieve muscular spasm and also to prevent the depression which so often follows use of opiates, is indicated in good-sized doses in angina and similar conditions to relieve pain and to quiet the frightened patient.

"Aseptic ergot" has been strongly recommended for heart failure, in subcutaneous doses, as a substitute for digitalis, but should not be used as an emergency measure.

Camphor-in-oil, also given subcutaneously, has been a favorite in the last few years for emergency stimulation; but while it has some value it is not worthy of the confidence bestowed upon it, and ranks far below some other drugs in practical use.

Adrenalin is fleeting in action, and not dependable, and the same statement might be repeated for pituitary extract, as emergency measures.

Alcohol, while popular, is not a true circulatory stimulant, and the great faith in its ability to do the impossible, as held by laymen, is not shared by the medical profession.

Aromatic spirit of ammonia has fleeting action, is a mild stimulant, possesses irritating qualities, and may have some virtue in a simple faint, but it certainly does not qualify as a heart stimulant for emergency work.

Strychnine is popular, but undeservedly so, as it fails to produce results in acute cardiac failure.

Amyl nitrite, nitrites of sodium, nitroglycerin, etc., are also fleeting in character, have a distinct value in angina pectoris, but are valueless otherwise.

Caffeine has some vasodilator properties, but acts more as a diuretic, and is not an emergency measure.

Cactus grandiflora, squill and sparteine sulphate have value, and when well chosen for selected cases, as for patients having idiosyncrasies for digitalis or strophanthus, or when the cumulative effect of digitalis appears and it becomes advisable to discontinue it for a while, cactus or sparteine is very dependable.

Thyroid extract has been known to help heart-block, by giving sufficient amount to produce a tachycardia. This may work all right from a theoretical point of view, but not enough cases have been reported to justify an opinion as to the real value of this method.

Convallaria majalis (lily-of-the-valley), adonis vernalis, apocynum cannabinum (Canadian hemp), have value as heart stimulants, but, like others mentioned, are not drugs for emergency in acute heart failure.

Digitalis is one of the most dependable and widely used drugs in medicine to-day, but acts too slowly for emergency use. It best serves its purpose in cases of failing compensation, and if used in acute cases it should be restricted to those wherein immediate results are not necessary.

Radiotherapy in Non-malignant Gynecologic Diseases.

In the *Journal of the Missouri State Medical Association* for July, 1921, GELLHORN states that the use of *x*-rays and radium has revolutionized the treatment of climacteric hemorrhages and of fibroids. The former, unless they are caused by cancer, can be cured almost without exception by either of the two agents or a combination of both. Of the fibroids, more than three-fourths of the cases are suited for radio-

therapy; and in these a clinical cure consisting of cessation of bleeding and shrinkage of the tumors can be produced in 98.4 per cent. In these cases, then, radiotherapy, which has no mortality whatever, is infinitely superior to surgical treatment, which is still burdened with an average mortality of about 5 per cent. There are, however, cases of fibroids left which should be treated only by operation. The indications for both procedures are to-day sharply defined. Either one or the other gives the better result, and hence has to be employed to the exclusion of the other. The man who administers radiotherapy indiscriminately disregards the best interests of his patients as much as the man who adheres exclusively to surgery.

Treatment of Piles Without Operation.

EADIE, in *The Practitioner* for July, 1921, states that a mode of curing (he uses the word advisedly) piles without operation, which receives far less attention from the medical profession than it merits, is the so-called injection method—the interstitial injection of each individual pile with some fluid such as carbolic acid. This neglect is perhaps the more strange when one takes into account the large number of sufferers from hemorrhoids in the profession who have themselves been successfully treated by this means. The technique is simple, and can be carried out in one's own consulting room; the results are immediate and excellent; an anesthetic is not needed; the patient does not require to lay up, but can get about his ordinary vocation.

During the last eighteen years Eadie has given, in hospital and private practice, many thousands of injections, and is convinced that when properly done the results compare favorably with the best of other treatments. So far he has never experienced any of the dangerous effects, such as septic thrombosis, which it is surmised should occur, but do not.

It is, in his opinion, the treatment of election for hemorrhoids, and can be practiced in all cases in which the rectal speculum can be introduced. It is especially valuable where operation is contraindicated.

He would relegate to operation only those few cases in which for some reason the speculum cannot be used without a general anesthetic; or when an anesthetic has to be given for some intercurrent condition the piles can be removed at the same time.

The technique adopted is briefly as follows: The patient lies on his left side, with the thighs fully flexed, on a firm couch or table, preferably at least 2 feet 6 inches high. The perineum is exposed to a good light. On the first occasion of seeing the patient one observes carefully for prolapse, sentinel pile, fissure, etc.; and besides examining the rectum digitally *re* stricture, prostatic enlargement, etc., it is well to make a general examination to elicit, if possible, the cause of the piles. The latter are demonstrated in the lumen of a warmed and vaselined proctoscope introduced into the anal canal, and each pile is then punctured by the needle of a syringe, and 3 to 5 minims of the injection fluid instilled. (The fluid he uses is acid. carbolic. 10 parts, hamamelis 10 parts, aqua dest. 80 parts). Three piles may be treated at one time. The anal canal is then swabbed dry of any injection fluid that may have escaped into it. The speculum is entirely withdrawn. The perineum is swabbed free of lubricant. The patient gets up and dresses, and goes about his business. The time taken from introducing the speculum to the final swabbing of the perineum does not in his own practice exceed 30 seconds.

The patient is instructed that he may expect a feeling of something having been done, not amounting to pain, and that his part in the performance is to avoid alcohol, condiments, and tobacco, and to eat plenty of fresh fruit and vegetables. He is also to take pains to keep the piles from prolapsing during the twenty-four hours subsequent to injection. Should he omit to do this the prolapsed pile may become inflamed and painful, which is no part of the treatment.

Treatment in like manner is given two or three days later, and repeated twice or

thrice a week until piles are no longer demonstrable through the speculum. An average of about nine treatments more or less is, in his experience, necessary. Pile patients complain chiefly of bleeding and prolapse. Many experience much relief after the first treatment; most feel cured after four. Piles can, however, be demonstrated in the anal canal after the symptoms have disappeared, and will eventually trouble the patient unless dealt with.

There appears to be a tendency for other veins of the anal canal to become varicose when the supporting pressure of the piles is removed, and, by seeing the patient from time to time, one can inject these as they show in the speculum, and before they give rise to symptoms. He therefore likes to keep the patient under observation for a year, seeing him every two or three months.

Most sufferers from hemorrhoids complain of constipation, and it is remarkable how this disappears with the piles; indeed, it is quite exceptional for it not to. He asks patients to leave off all purgatives.

He refers to the treatment of internal piles—*i. e.*, piles covered by mucous membrane. He regards external piles (those with a skin covering) as the outward and visible expression of internal, and as the latter disappear so do the former either completely shrivel away or leave a remnant as a skin-tag, which, if need be, may be snipped off.

The untoward effects very occasionally following an injection are:

(1) *Pain.* This may result from: (*a*) Injecting an inflamed pile. This should be avoided, and no injection given until inflammation has subsided. (*b*) Injecting a prolapsed pile and either not returning it into the rectum or allowing it to prolapse again and become strangulated. The patient should take some trouble to keep a prolapsing pile up for twelve hours after its injection. After a few injections, often after the first, the tendency to prolapse will cease. (*c*) Injecting too low in the anal canal, where the latter is supplied by nerves from the perineum. It is well to start injecting high up and gradually work downward, leaving the lower inch of the anal canal till the end of treatment. By so doing that part will probably require no injection at all.

(2) *Sloughing* of the mucous membrane. This will result from too superficial an injection. The sloughs are small, and, although he has not known any harm from them, are undesirable. He endeavors to inject about ¼ inch below the surface of the mucous membrane.

(3) *Urinary irritation* may result from injecting in too close proximity to the urethra or prostate. It is not usually severe and passes off in an hour or two.

Prognosis after this treatment is, in his experience, as good as after operative measures. If the original cause of the piles, such as an enlarged prostate or cirrhotic liver, is still operative, then a recurrence is likely sooner or later whether the patient is treated by injection or operation. It is, however, a very simple matter to give a few further injections from time to time as the need arises.

Incidentally, he has been using this injection treatment for pruritus ani with very gratifying results.

[It is to be recalled that this method was extensively used by Kelsey many years ago, but seems not to have met with general favor—Ed.]

Acute Postoperative Dilatation of the Stomach.

Novak in the *Journal of the American Medical Association* of July 9, 1921, states that the treatment of acute postoperative dilatation of the stomach, to be successful, must be instituted early. There are few postoperative complications in which prompt recognition is so important to the patient. The diagnostic features of the condition have already been discussed. The two principal measures for the relief of the gastric dilatation are briefly as follows:

The stomach-tube has saved the lives of many patients who have developed postoperative dilatation of the stomach. This fact has not always been appreciated, for,

as has already been stated, many a case of gastric dilatation has been wrongfully diagnosed as peritonitis. Fortunately, however, the stomach tube has often been used just the same, to the advantage of these patients. Certainly gastric lavage should be carried out in every case of postoperative dilatation, first for diagnostic and later for therapeutic purposes. In some the distention of the stomach is so great that the tube must be introduced much farther than usual in order to evacuate the contents. Payer has advised the employment of lavage in the elevated hip posture, in order that advantage may be taken of the factor of gravity in facilitating complete evacuation of the stomach. The frequency with which the lavage is to be carried out depends on the amount of gas and fluid evacuated. This, as has been seen, is often very great, owing to the extreme degree of hypersecretion present in many cases. In such cases lavage is often necessary at intervals of every few hours. When the lavage treatment is instituted early, the results are as a rule very gratifying; when begun late, the treatment may prove of little avail. According to Borchgrevinck, in forty-eight cases treated by lavage alone, twenty-four patients got well and twenty-four died. The latter group undoubtedly, however, embraced some late and some complicated cases.

The postural treatment was originally suggested in 1895 by Schnitzler, and has been carried out in a large number of recorded cases. It is based, of course, on the theory that the dilatation is the result of duodenal occlusion by the mesentery, and that this can be relieved by placing the patient in the prone or elbow position, thus lifting the intestine and mesentery off the duodenum, as it were. The results reported from the method have been, in the main, favorable, although it is by no means invariably successful in the relief of the symptoms. The method is still employed, even though, as we have seen, there is little doubt as to the incorrectness of the theory on which it is based. It was used in two of Novak's cases with satisfactory results. In one case the relief given to the patient by being placed in the prone position was immediate and striking, in the other it was less pronounced but quite definite.

The good results of this position are not to be taken as a proof of the correctness of the duodenal occlusion theory. Certainly the evacuation of the stomach by vomiting is prompted by the assumption of these postures irrespective of the presence of a mechanical block in the duodenum. It should furthermore be mentioned that in many of the cases in which postural treatment was resorted to, gastric lavage was employed synchronously. Aside from the prone and knee-elbow position recommended by Schnitzler, other forms of postural treatment have been suggested. Robinson and Müller recommend placing the patient on the right side to facilitate emptying of the stomach into the bowel. Payer, indeed, advises placing all patients on the right side as a prophylactic against this complication. Kelling's suggestion, on the other hand, is to place the patient on the left side, thus overcoming the valve-like closure of the cardia to which he attributes the dilatation. This conception is probably erroneous, and the Kelling posture is not to be commended. Finally, allusion has already been made to the apparently worth-while recommendation of Payer, to place the patient in the elevated pelvic position during lavage, in order to empty the stomach more completely.

From the standpoint of both rational and of clinical results, Novak believes it may be stated that there is no place for operative measures in the treatment of acute dilatation of the stomach. Various forms of operation have been done in an effort to relieve the condition, but the results have been so unfavorable as not to justify them. Doolin found that of thirty-one patients operated on, only eight recovered. The following operations were done in this series: gastrotomy, six cases, with five deaths; gastrostomy, seven cases, with six deaths; gastroenterostomy, seven cases, with four deaths; jejunostomy, one case, one death; exploratory laparotomy, eight cases, five deaths. He concludes:

1. Acute postoperative dilatation of the stomach is an important and dangerous surgical complication which is probably less infrequent than is generally believed.

2. Its early recognition is of vital importance to the patient, for on it, to a large extent, depends the success of treatment.

3. The use of the stomach tube is the most important means of diagnosis.

4. Especially important is the differentiation between gastric dilatation on the one hand, and peritonitis or postoperative ileus on the other.

5. Dilatation of the stomach is a frequent concomitant of peritoneal infection.

6. The evidence points strongly to gastric paralysis as the immediate cause of the dilatation.

7. In the primary cases, such as those occurring during operation, the gastric paresis is explainable as a simplex reflex. In the secondary cases the dilatation is the result of septic factors, although it is possible that occlusion of the upper intestine may in rare cases be the primary factor.

8. The two important therapeutic measures are gastric lavage and the postural treatment advocated by Schnitzler. The latter is incorrect in theory, but often successful in its results.

9. There is no place for operative measures in the treatment of acute postoperative dilatation of the stomach.

Albert J. Ochsner, in discussing the paper of Dr. Novak, stated that the symptom which the nurses recognize first is the effect of the dilatation on the heart. The heart is displaced. The nurse notices that the heart has "gone bad" and thinks that something has happened, but does not recognize the cause. For many years he had occasional cases of acute postoperative dilatation of the stomach. Now he has a standing order that the moment a patient vomits, or is nauseated, or complains of gas pressure, gastric lavage is made with water at a temperature of 105° F. The heat stimulates contraction of the stomach and cleanses it of any jejunal contents which may have regurgitated into the stomach. For the last fourteen or fifteen years since this routine has been followed, he has had no further cases of dilatation. Placing the patient across the bed on the face is the first thing the nurse should do; then the stomach-tube is passed and the stomach washed out.

The Tonsils and Scarlet Fever.

BULLOWA, in the *American Journal of Diseases of Children* for July, 1921, in concluding an article on this topic says that the statistics and the cases he narrates lend support to the view that the inflamed tonsil is a focus of infection and that the cervical lymph nodes enlarge from it in scarlet fever just as they might enlarge in the absence of scarlet fever. The inflamed tonsil becomes a phlegmon on the wall of the pharynx.

Rhythmic swallowing movements when they compress the tonsils force toxins or organisms into the lymph stream with subsequent inflammatory reaction in the adjacent lymph nodes.

Prophylactic removal of the tonsil when buried, or covered with plica, or incision of the plica so as to uncover the tonsil, prevents some of the severe complications arising from this source.

Painstaking observation of the tonsil during scarlet fever is helpful, and leads to the view that the infection is conditioned by the anatomical relations.

In certain selected cases tonsillectomy may be performed with benefit during scarlet fever.

The Schellberg Treatment for Chronic Colonic Infection.

GALLAND, in the *New York Medical Journal* of July 20, 1921, states that the treatment perfected by Schellberg from his original method has for its fundamental principle the use of lavage by which all parts of the large gut can be reached and cleansed by antiseptic solutions. Following the cleansing and the disinfection of its walls, he has carried the treatment to a cure by adopting nature's means of preserving the balance of power to the bene-

ficial organisms by planting in the cleaned and sterilized gut pure, healthy cultures of bacillus bulgaricus and bacillus acidophilus.

The treatment employed calls for a special but not complicated equipment: A three-gallon irrigator connected with a three-quart irrigator; a forty-six-inch rubber rectal tube stiff enough not to bend on itself or be blocked by intestinal pressure, the tip sufficiently flexible to pass around the flexures of the colon; pure culture of the bacillus bulgaricus and bacillus acidophilus in the incubator for seventy-two hours; culture tubes for obtaining growths to determine the character of the intestinal flora.

The most satisfactory solution for the large container is found to be one-tenth-of-one-per-cent chlorazene, as chlorazene does not absorb readily. The temperature of the liquid in the large container should be kept at 37°C. One to eight thousand collene (a colloid of silver), or one to thirty thousand chinosol, may be used in the smaller tank; the temperature of this solution to be kept at 52°C. for use. The irrigators should be placed at least three feet above the patient. A large connecting tube from each passes through a three-way valve connection. This in turn is connected to the rectal tube. If one wishes to inject an oily substance, such as kerosene or turpentine, a ten- to 20-per-cent ichthyol solution as a medium should be used. This emulsion is best forced through the rectal tube by a hard-rubber syringe. The giving of a cathartic will aid in the cleansing process.

The observation has been that the sigmoid lies most generally in the central line, the normal inclination being to the left side; a few have been found on the right. As a rule, Schellberg begins the irrigation with the patient lying on the left side to gain the slight advantage of gravity. With the rectal tube completely filled with the solution from the large tank, taking great care that all air is expelled from the tube, the tip is introduced into the rectum. Allow ten ounces to flow into the rectum, shut off, and permit the gas and any fecal matter present to escape. When the rectum is clean of feces, turn on the water, dilate the gut, and begin feeling the way up into the intestine with the tube. Never try to advance the tube without the water flowing. After proceeding a distance, it is wise to shut off the flow and allow the expulsion of the bowel contents. Again turn on the water and proceed to advance the tube further. Go slowly, be gentle, persevere, and the ascending colon will be reached, and possibly even the cecum, no matter how misplaced, ptosed or pocketed the gut may seem. Gentle perseverance with the water pressure will allow one to reach the goal, unless there is some growth obstructing the gut.

One must learn to differentiate the feel between the tip of the tube striking a fecal mass and the wall of the intestine. If one does not learn to differentiate, he will not have great success with the procedure. As the water flows into the bowel, with one hand on the patient's abdomen, the operator can easily trace the gut as it fills, except where the abdominal walls are very thick and the intestine lies close to the back. Even in such cases practice will enable one to detect and trace it. When the tube has reached the splenic flexure, place the patient on his back, and, by the aid of the water pressure, make the turn. With a little patience the tip of the tube will pass that turn into the transverse colon. Here one may need to turn on the solution from the small tank, and by the heat of this solution to excite upward peristalsis to carry the tube farther. Once beyond the flexure, irrigate before proceeding.

At first the treatments were begun solely for cleansing the gut. As Schellberg followed certain cases, he found that he not only cleansed the gut, but where there was marked prolapse and displacement, even where the colon had been bound down by adhesions, persistence for a time freed the intestine, making it normally movable as well as relieving the sagging and ptosis. The correction of the sagging and ptosis was to be accomplished by a removal of the abnormal load of fecal matter and by the stimulation of the cleansing. The free-

ing of the gut from adhesions was not expected, but is forming one of the most gratifying results of this treatment.

The study of conditions within the abdomen on the operating table and from autopsies teaches that intestinal pockets are common in the colon, formed, as we know, when two inflamed surfaces lie close together in the lumen. The exudates from the inflamed surfaces coalesce, consolidate, and form a band of tissue which contracts, pulling the two points together, forming a pouch in the intestine, the blind sacs making perfect bacterial incubators. (To these exudates Schellberg has given the name intestinal interlining adhesions.) No cathartic or intestinal antiseptics given by mouth will clean these. Nor will the usual enemas remove the contents of such a pocket. The irritation caused by the bacterial growth in these pouches causes a reaction on the walls of the intestines, with the throwing out of a serous exudate which later becomes organized, forming the so-called adhesions, binding the colon to the abdominal walls or some intra-abdominal structure. As a result there is a colon which has not only lost its mobility, but has become an incubator for bacteria and a producer of toxic material. He found that by passing the tube over these pockets daily with the stretching of the colon, his solution loosened these interlining adhesions, which were expelled, and at times would break loose some of the external adhesions. Sometimes this happened during the treatment, causing the patient sharp pain. More frequently it came after the lavage. With the opening of the pocket and the removal of the irritating accumulation, the adhesion bands immobilize the organ, atrophy, and give way. He has seen misplaced immobile colons become mobile and resume their normal anatomical position after ten days of treatment. The parting of the binding adhesion may give the patient a sharp, stabbing pain, which is of short duration.

Schellberg has learned that until the colon is fairly sterile no lasting benefit is to be gained by the planting of the bacillus bulgaricus or the bacillus acidophilus. His method is to wash the colon daily with the antiseptic solution until the smears show a low bacterial count in the gut. The desired sterile condition is achieved in ten days with the average case. Streptococcus and staphylococcus organisms must be reduced to the minimum before planting.

Not infrequently a case is met in which the antiseptic solution causes such an irritation that one must stop the irrigation before the desired cleanliness is obtained. Into these irritable colons Schellberg introduces a one-per-cent solution of dextrose, and a planting of twenty to thirty billion acidophilus and bulgaricus is made as high up in the gut as possible. After three or four of these daily plantings the intestine is usually quieted so that the disinfection can be resumed.

A few cases which had apparently been in condition for the permanent planting later showed increased or renewed streptococci and staphylococci after two weeks. In such he disregarded his plants and renewed the disinfection. With the acidophilus on the increase with the absence of streptococcus and staphylococcus organisms, a chance of recurrence is not great. With ordinary care and diet, patients have shown a vigorous growth of acidophilus two years after this treatment.

For planting, Schellberg uses four ounces of a one-per-cent dextrose solution, containing twenty to thirty billion acidophilus and bulgaricus, injecting this into the ascending colon or cecum. The temperature of this solution should be 50° C., a planting made daily for from four to seven days, and then every second day for four or five treatments. The patient is placed on the right side for the planting. Before injecting the plant, one should be sure that all the solution used to introduce the tube has been expelled and that peristaltic action has become quiet. Following rectal plant the patient should remain quiet, lying on the right side for thirty minutes after the planting. After colonic treatment is discontinued the patient is instructed to continue taking active liquid cultures of bacillus bulgaricus by the mouth.

Diagnosis and Treatment of Congenital Syphilis.

MARSHALL, in the *British Journal of Children's Diseases* for April-June, 1921, states that as a general rule it is advisable to treat the infant of a known syphilitic mother after birth, whether it has a negative or a positive Wassermann reaction, and whether it shows signs of congenital syphilis or not, for we know that the majority are born with no symptoms and are often negative, and that some may have visceral syphilis.

Here again it is best to give combined treatment with arsenic and mercury. Many practice intravenous injections of arsenic, using the veins of the scalp, the external jugular, or the dorsal veins of the foot. Some inject into the longitudinal sinus. Others obtain equally good results with intramuscular injections. Personally he prefers intramuscular injections made up with glucose, which diminishes the pain. Necrosis of the buttock, so often mentioned as an objection to this method, is in his opinion rather a bogey. He has never seen it, and Adams, who has used intramuscular injections of galyl and glucose for several years at the Thavies Inn Clinic for pregnant syphilitic women, has never had a case. Perhaps the cases of necrosis reported are due to too bulky injections, or possibly to the mixture with creocamph, which he has seen cause large and painful nodosities.

Mercury should be given simultaneously, either in the form of gray powder or inunction, and it is important to continue mercurial treatment for a year at least.

Late congenital syphilis should be treated with arsenic, mercury, or iodides, according to the conditions presenting themselves. As a rule, however, it reacts less favorably than acquired syphilis to salvarsan, and some conditions improve better under mercury and iodides.

We now come to the question of the treatment of the children of syphilitic parents in whom there are no definite signs of congenital syphilis and no history of such in infancy, but who are found to have a positive Wassermann reaction.

This is a somewhat similar problem to that of the treatment of a persistently positive Wassermann reaction in acquired syphilis and depends on the signification of the reaction. Most pathologists are of opinion that a positive Wassermann reaction always signifies the presence of active spirochetes, but Levaditi, one of the early pioneers in this subject, has suggested that it may be of the nature of an immunity reaction which may continue some time after cure.

Clinicians are divided on this question. Some advocate continued courses of intensive treatment with salvarsan with the object of getting a negative reaction; others hold that such treatment is unnecessary and detrimental to health.

Personally he thinks that such cases should be kept under observation and tested again later on, but he does not think that intensive treatment is indicated on the sole evidence of a persistently positive Wassermann reaction. There must be a limit to a patient's capacity for "606," and there is no limit to the amount indicated by some enthusiasts. As a matter of fact, the Wassermann reaction is too recent for this question to be decided, as it has been in general use little more than twelve years. We do not know how long the reaction may remain positive, nor do we yet know whether it is those cases with a persistently positive reaction which develop tabes, general paralysis, and other late manifestations.

But what we do know—at any rate those who are not in their first youth—is that a multitude of patients who were treated in the pre-Wassermann days (with mercury only) developed no further symptoms, married, and had healthy children. It is more than probable that many of these had a persistently positive reaction. It is very likely that the reaction has a tendency to become normal in course of time.

We also know: (1) That the reaction may remain positive in spite of prolonged treatment—for anything we know because of too much treatment; (2) that a positive reaction may become negative without further treatment.

Again, even if a positive reaction signifies

active spirochetes, a negative reaction does not exclude them. Warthin found evidence of active syphilis in the post-mortem examination of many patients who had given a negative Wassermann reaction during life.

It would therefore appear unwise to depend upon the sole evidence of the Wassermann test as a guide to treatment. This, and other tests, must be taken in conjunction with clinical experience, the cultivation of which has of late been somewhat neglected.

Since this article was written, Dr. Levaditi has informed Marshall that he has renounced his earlier idea, and believes that a positive reaction always signifies living spirochetes; but he admits that this is non-proven.

Infective Arthritis and Allied Conditions.

In the *British Medical Journal* of June 4, 1921, WILLCOX states, with reference to treatment, that the most important step is to first find out the cause of the infection which has given rise to the arthritis. The measures to be adopted are generally known. A careful and complete clinical examination should be made to find out any possible source of infection, and this should be supplemented by an *x*-ray examination of the teeth and bacteriological examination of the stools and urine.

In acute cases with pyrexia absolute rest in bed is essential and complete rest of the affected joints. Local applications of heat, such as electric light baths, or fomentations, iodine poultices, etc., are of value. Salicylates, which are of such striking benefit in rheumatic fever, are of little value. Indeed, drugs, except for the relief of pain—such as pyramidon and phenacetin—are not of much use. Intestinal antiseptics—such as guaiacol carbonate gr. x t.i.d., or cyllin min. iij—should be given. A new intestinal antiseptic, "dimol," which is said to have fifteen times the disinfecting power of phenol and to be non-toxic, may be given in doses of 2 to 4 grains in keratin capsules three times daily. Bier's treatment is of value until the exciting cause has been determined; an elastic bandage is placed round the limb above the affected joint so as to obstruct the veins but not the arteries, and is left on for twenty minutes daily.

In cases without pyrexia, if there are signs of active inflammation in the joint, such as redness, heat, swelling, or pain, rest of the joint is essential, and local and general treatment as above should be prescribed. Iodine is of value. Collosol iodine in doses of 1 to 2 drachms with a wineglassful of water should be given twice daily. Iodides, if tolerated, may be given instead.

As soon as the source of infection is found this should be eradicated if possible. Where the teeth are implicated or an apical dental infection is found, the affected teeth should be removed and placed in a sterile vessel for bacteriological examination. A satisfactory way of dealing with an apical infection is Gardner's method of sterilizing the infected bone area by removal of the alveolar layer over the site of the lesion and curetting away the diseased tissue, and sterilization after removal of the offending tooth. This involves a cutting operation over the gum of the affected part.

The vaccine treatment is of great value, but it cannot be too strongly insisted upon that it must be accompanied by removal of the causal infection. Affected teeth should be removed, and a vaccine prepared after guarding against possible contamination of the teeth removed with normal streptococcal organism found in the mouth. A course of at least three months of vaccine treatment is usually required, with weekly and later fortnightly doses. It is a wise procedure to have a bacteriological examination of the feces made, even if a dental streptococcal infection has been found. Usually an abnormal streptococcal intestinal infection is also present in such cases. It is then an advantage to use for treatment a combined vaccine made with equal proportions of the dental and intestinal streptococci. In cases in which the teeth have been removed and arthritis still persists, an examination of the feces or colon washings will usually indicate a streptococcal infection, and in such cases vaccine treatment may give benefit.

In chronic and subacute cases electric light or radiant heat treatment should be given daily or on alternate days, and this should be immediately followed by ionization with iodine ions, a 2-per-cent solution of lithium iodide being placed on the lint of the cathode. In cases in which much pain is present ionization with salicylic acid ions is of value. Diathermy is of value in relief of pain.

When there are no signs of active inflammation and the infective cause has been removed, massage and movements of the joints are indicated. Where the joint movements are much limited in such cases breaking down of adhesions under an anesthetic or suitable surgical measures may be adopted.

In pyrexial cases the diet should be mainly liquid, but it must be borne in mind that most cases of non-specific infective arthritis require a diet of high nutritive value, and attention should be directed toward giving a dietary rich in vitamines. Milk, cream, eggs, the unheated juice of fresh lemons or oranges, fresh fruits and vegetables, fish, chicken, and meat, may be given according to the digestive capacity of the patient. If tolerated, milk fermented with lactic acid bacilli is of value in controlling intestinal fermentation. Cod-liver oil and malt, or one of the many substitutes for this now on the market, may also be given with advantage.

In cases of fibrositis of aponeuroses and tendons local electric light and massage gives the best results; diathermy and ionization are sometimes beneficial. In perineuritis, such as sciatica and brachial neuritis, frequent application of electric light gives the best results. Ionization is sometimes of value, and if there is much pain salicylate ions should be used instead of iodine. Iodine may be given internally, and aspirin, phenacetin, or pyramidon for relief of pain. The local application of a mixture of equal parts of chloral, menthol, and camphor, on gauze covered by oil silk, is very helpful. Complete rest during the acute stage is necessary. In bursitis and tenosynovitis, local treatment by electric light and ionization is indicated. In chronic villous synovitis where the above measures fail, the opening of the joint surgically and removal of the villous outgrowths has given good results.

Where a case of early arthritis is subjected to investigation and treatment on the above lines, a complete cure can be effected. In cases of long standing the inflammatory changes are often progressive in nature, and removal of the primary cause may do little good because the infective process is being carried on by a secondary intestinal infection. In such cases everything possible should be done to remove both the primary and secondary causes of infection, and when the signs of active inflammation in the joints have ceased, measures should be taken to improve the mobility of the joints and muscular tone by massage and movements.

Chronic Lead Poisoning in the Printing Presses of Calcutta.

CAMPOS, in the *Indian Medical Gazette* for May, 1921, states that among printers in India lead is largely absorbed through the lungs as the presses are full of dust which is inhaled, especially as a result of dry sweeping, which is common in all the presses. An analysis, by Rueszagzi, of dust from type cases showed that it contains 57.7 mg. of lead, 186.8 mg. of antimony, and small quantities of arsenic. In this connection it must be mentioned that the metal of which the type is made consists of 75 per cent lead, 20 per cent antimony, and 5 per cent tin. The presence of antimony also suggests the possibility that some of the symptoms of typesetters may be due to antimony absorption going on for long-continued periods of time. It is also absorbed through the skin, though not so often through the unbroken skin as when there are erosions, which occur among printers as a result of using lye for cleaning the surface of the type. It is also certain that it is absorbed through the gastrointestinal tract, as betel chewed and food eaten in the presses is touched by soiled hands.

Besides, compositors have bad habits of holding the lead type in their mouths while setting or sorting it, and of moistening their fingers in their mouths in order to hold it better. Oliver reports that the water in which printers wash their hands was found by Van Eyk to contain from 6 to 15 mg. of lead per man. Lead is eliminated through the kidneys and the skin. Even when there are no symptoms of lead poisoning lead can be detected by chemical tests in the urine of the printers. It must be mentioned in this connection that albuminuria and nephritis are very common among printers.

His observations, though not very exhaustive ones, are sufficient to prove that in the presses of Calcutta there are and have been many cases of chronic lead poisoning. It is true the anemias in some cases may be due to malaria from which the printers commonly suffer, and constipation is such a general complaint that it cannot be attributed to lead alone. But the colic, the blue line on the gums, the history of cases of lead paralysis and the changes in red blood-corpuscles are enough to warrant his conclusions.

It is clear from the cases observed that in better ventilated presses and wherever some cleanliness is observed there is less absorption of lead. Susceptibility is remarkably variable. An old man in press No. 2 after working for forty years has less evidence of lead poisoning than a young man in press No. 1, who after working for six years only developed a blue line on the gums and suffers from colic, constipation, and diarrhea. The difference in these two cases may be really due to the one observing the hygienic principles in the work-room and in the house better than the other. One fact which vitiates the statistical data is that as soon as printers begin to have neuritic pains in the hands or the legs they leave work and are heard of no more. This is the reason why more cases of lead paralysis are not found in the presses. Probably they pass to the hands of a village doctor or a Kaviraj for treatment, while the causal relation between his former occupation and his disease is forgotten.

The Treatment of Erysipelas.

PORTER, in the *Indian Medical Gazette* for June, 1921, states that he has lately seen rather striking results obtained in the treatment of this disease by the use of carbolic acid, and, as it may not be generally known, he desires to bring it to the attention of the readers of that journal. The treatment consists in painting the entire surface of the involved area with 95-per-cent-pure carbolic acid on a cotton-wool swab and extending half an inch into apparently healthy skin.

It is left on until the purplish area of the inflamed skin is replaced by a pretty complete whitening of the skin, which must be waited for.

The whitening must not be allowed to proceed to complete blanching, and when large areas are involved, only a portion must be painted at one time.

The second step consists in going over the blanched area with swabs saturated with methylated spirit.

If thoroughly done, the whitened area again becomes pink, and the alcohol must be laid on until this is accomplished. Afterward, other areas should be attacked in the same way until the whole operation is completed in one sitting. The subsequent management consists in the application of moist dressing—simple saline or 1-in-20,000 bichloride of mercury.

His first case was an old lady in whom the disease had affected one thigh and leg to a considerable extent. The second was a case of facial erysipelas. Both had been given full doses of antistreptococcic serum before he saw them, but the disease was still spreading. In the second case he gave two intravenous injections of liquor iodi xx minims at 24 hours' interval. This was equal to 1 grain of solid iodine, and recovery was very rapid.

In both cases the spread of the inflammation stopped at once after the application of the carbolic acid.

The usual dietetic and remedial measures were, of course, employed in each case.

The importance of attacking the spread-

ing edge of the inflammation has, of course, been known for many years, and various remedies, such as nitrate of silver, tincture of iodine and tincture of ferric chloride, have been used. Porter asserts that none of these remedies have anything like the potent and rapid effect which is produced by carbolic acid, used in the way he has above described.

Treatment of Hemorrhoids by Electrolysis.

SIGMOND, in the *American Journal of Electrotherapeutics and Radiology* for June, 1921, states that if the operator has a good galvanic outfit and understands the polarity effect he can get excellent results, does not confine his patient to bed, does not run the chance of an infection, and does not expose his patient to the dangers of an anesthetic.

In order to secure the desired results the action of the two poles must ever be borne in mind. Electricity is a dependable agent, acting in its various forms according to well-known laws which must govern its uses. The special properties of each pole are physical and therapeutic. Each is the opposite of the other. Thus at the positive, oxygen is produced; at the negative, hydrogen. The positive produces an acid condition; the negative, an alkaline. Positive is a vasoconstrictor and stops bleeding, while the negative is a vasodilator and favors it. The positive is a drier of tissue and hardens it, while the negative produces moisture and softens it. The positive exerts a sedative influence, while negative irritates it. The positive coagulates the albumin of the blood, while the negative liquefies and disintegrates organized structures.

There are several methods of treating hemorrhoids electrically, and all of them have their advocates. On the one hand, all methods are condemned by those whose experience with them has not been satisfactory. He has tried several methods, but prefers the positive pole, using the needle. The preparation of the needle is as follows: (1) Take an ordinary cambric needle and insulate it by winding silk thread around it from one-fourth inch from the eye to within one-fourth inch of the point. (2) Stick the point of the needle into a cork for about one-eighth of an inch, thus leaving one-eighth of an inch above the cork. (3) Shellac the needle from the upper end of the thread down to the cork, thus leaving the part above the thread unshellacked and uninsulated to fit into the needle holder. The part in the cork is also uninsulated. After the shellac has thoroughly dried, remove the needle from the cork and it is ready for use.

For local anesthesia use quinine and urea hydrochloride or novocaine. Inject the pile and wait a few minutes for the anesthetic to take effect. The negative pole is attached to a large moist pad and strapped to the abdomen so as to make and keep good contact, thus assuring one of a steady current, because if the current breaks it is uncomfortable to the patient. Attach the positive pole to the needle and insert the needle in the pile. Insert it into the top of the pile, carrying it up to the thread; thus your uninsulated point is in the pile. The idea of the thread is to make a shoulder to prevent your inserting the needle too deep, and by using the thread for a guide you can always know that you are just in deep enough and not beyond where you want to stop. The shellacked insulation is in the wall of the pile, and the current then goes into the pile. Use about ten or fifteen milliamperes until the pile gets a decided blanching or ashy appearance. Puncture the pile as near the top as possible, because if one gets too close to the base, after-pain develops.

For about two days one will notice no decided change in the patient, but on about the third day one will see a smile of satisfaction. Always warn the patient that it will be a day or so before he can expect much of a change, and he will not be disappointed at not getting immediate relief.

Treat each pile separately, using a new needle for each pile, because the positive pole causes the needle to roughen, deterio-

rate, and thus it will break off when used the second time. A good way is to treat one pile at a sitting; however, some treat all of the piles at one time. This Sigmond believes causes too much strain on the patient; whereas by treating one pile at a visit he notices no inconvenience.

It is necessary to have an assistant, as some one is needed to hold the speculum while the operator guides the needle with one hand and turns on the current with the other.

There are various specula on the market that can be used to bring the pile into view, so one can use the instrument to which he is most accustomed.

It must be remembered that this treatment is not a panacea for all rectal troubles, but for all internal piles that are not of the fibrous variety one can assure the patient of a cure.

The Basis of a Scientific Therapy.

Writing in the *British Medical Journal* of June 4, 1921, MACKENZIE states that a matter which strikes every one who gives it attention is the curious difference between theoretical and practical therapy.

We have the experimental pharmacologist demonstrating to the student with precision the effects of remedies by animal experiment. The student as soon as he enters the wards of the hospital finds a different atmosphere—drugs are administered without any reference to their experimental effects, and he finds the knowledge he has acquired in his pharmacological course of no use.

The pharmacologist scoffs at the clinician as unscientific and as employing empirical methods. The clinician replies that the laboratory teaching is academic and unpractical.

Mackenzie stated that the action of digitalis on the human heart is not understood, and when he made the observations on the effects of digitalis during his inquiry into mitral stenosis, he was struck by the variety of results obtained. In one patient digitalis would produce dropping out of beats due to heart-block; in another it would cause the whole heart to stand still for two or three seconds, and then the ventricle would start off by itself; in another great slowing would result; and so on. When he looked at these patients individually, he found they all suffered from damaged hearts, but there were differences in the kind of damage, and he therefore formulated the theory that the action of digitalis is modified by the nature of the disease. It is manifest that the pharmacologist could never find this out, and his results were different, therefore, from that of the clinician. On the other hand, the knowledge of heart irregularities has been so defective that the clinical observer could not recognize them, but saw that they were different from the description given by the laboratory observer. That is the reason of the failure of the pharmacologist to explain the action of digitalis on the human heart, and the reason why the clinician could not recognize it.

This idea, at first dimly perceived, holds out the possibility of directing therapeutical research on lines based upon sound principles. One of the least creditable fields of knowledge is the therapeutic. While many drugs are usually employed, it must be confessed that our knowledge of the action of remedies is sadly lacking in accuracy. To this defect must be attributed that wide diversity of opinion as to the action of the simpler remedies and that confusion which bewilders the student.

Their inquiry into the nature of symptoms led the staff at St. Andrews to recognize that a great mass of symptoms is due to disturbances of normal reflexes. When a man falls ill, due, say, to the invasion of his body by a microbe, the toxins of this microbe produce the ill health by upsetting the normal reflexes, and we recognize these disturbances as the signs of disease.

The administration of a drug such as atropine acts in the same way by disturbing certain reflexes. Indeed, the effect of atropine may be described as an imitation disease. One of its effects is to paralyze the peripheral ends of the vagus and cause an increase in the heart-rate. If digitalis

is given it is without effect, because digitalis stimulates the vagus, and under atropine it is paralyzed.

In certain infections the heart-rate is increased because the toxins act like atropine, and digitalis does not slow the heart because the vagus is paralyzed, and that is the reason why digitalis does not slow the heart in a great many febrile and other conditions.

In auricular fibrillation the increased pulse-rate is due to a totally different mechanism. Here the ventricles are stimulated to increased rate by a shower of stimuli from the fibrillating auricle. The vagus is unaffected, and so the digitalis, when given, acts as we have seen on the bundle which conveys the stimulus from auricle to ventricle, and it is probably in this way that digitalis is so effective in slowing the heart-rate in auricular fibrillation.

Hemorrhoids and Anal Fissures, with Special Reference to the Desiccation Method of Treatment.

CLARK, in the *American Journal of Electrotherapeutics and Radiology* for June, 1921, states that the term "desiccation" is descriptive of the effect produced upon the tissues by heat generated by means of the high-frequency current, which is regulated so that the intensity is less than that of the actual cautery. The method of heat production differs from that of the actual cautery inasmuch as the heat is generated in the tissues by the resistance offered to the current, and has greater penetrating properties than the cautery as ordinarily used. The heat from the actual cautery is transmitted by contact with the tissues and is comparatively superficial in action. The desiccation method is one by means of which any accessible neoplastic tissue may be devitalized by heat of just sufficient intensity to desiccate it. Any standard high-frequency machine generating sufficient current can be used for this purpose and the technique easily learned with a little practice. A monopolar current of the Oudin type is employed. This is applied to the lesion by means of a needle held in a suitable insulated handle and connected by means of an insulated wire to the high-frequency apparatus. The current strength to destroy growths of different sizes must be estimated. When the hemorrhoids are small the current is delivered through a short air space between the needle and the hemorrhoid; when of medium size the needle is brought in contact; and when large the needle is inserted into the hemorrhoid. No infallible rule can be given for the application of the desiccation method, for good technique must be acquired by practice.

The technique of infiltrating the sphincter muscle with a 2-per-cent solution of novocaine and adrenalin is simple, and consists of plunging the hypodermic needle at right angles and injecting 2 or 3 Cc. of the anesthetic deeply into the muscle about one inch from the anus. About five equidistant injections around the anus are sufficient to block the sensory nerves and render complete stretching of the sphincter possible. Care should be taken not to inject the novocaine subcutaneously, else the patient may suffer after-discomfort owing to resulting edema of the parts.

The slight postoperative discomfort is explained by the fact that the trauma to the tissues is slight as compared with the cautery, excision and ligature operations. Danger of stenosis is avoided because a contracted cicatrix does not result after the proper application of the desiccation method, since from a pathological standpoint contracted scar tissue is in proportion to the amount of trauma and secondary inflammation, and, as before stated, the trauma to the tissues produced by the desiccation current is comparatively slight.

Embolism is avoided because the dilated hemorrhoidal veins are completely destroyed and no chance is given for clotting. Secondary hemorrhage is avoided for the reason that the desiccating current penetrates for a short distance below the blades of the clamp, firmly sealing the vessels. This is not the case with the ordinary cautery, which seals the tissues superficially.

The desiccation treatment of external

hemorrhoids and hypertrophic tabs of tissue around the anus is simple and satisfactory. After local anesthetization a line is desiccated across the hemorrhoid instead of a primary incision with a scalpel. The needle is then inserted into the clot which is desiccated and the vein destroyed. The hemorrhoid is then incised through the desiccated line without hemorrhage and the desiccated clot curetted out. Relief is immediate and healing is rapid. Loose hypertrophic tabs around the anus are desiccated and allowed to slough, or they may be excised after the desiccation without hemorrhage.

The desiccation method for the radical treatment of internal hemorrhoids, no matter how extensive they may be, whether with sessile or pedunculated bases, has been found to be most satisfactory. This is true also of papillomata and other benign growths of the rectum and of urethral caruncles in the female. The usual preoperative preparation of the patient is carried out. Local anesthetization is usually employed by the method indicated, though in some supersensitive individuals a general anesthetic may be used. After stretching the sphincter each hemorrhoid is pulled down in turn by means of tenacula and the pile clamped at its base in the direction of the muscle fibers which are at right angles with the anus. The postoperative discomfort is so slight that frequently patients proceed with their duties of life immediately after the operation, but this is not usually advised if the case is a bad one, as it is best for such patients to remain in bed for a few days. The bowels should be opened the second day with a saline, and mineral oil used for about ten days thereafter.

In cases of anal fissure after the usual preoperative preparation of the patient and local anesthetization by the method indicated, the sphincter muscle is stretched, if the fissure is in the grasp of the muscle or above the muscle. If below the muscle, this stretching is not necessary. The fissure, which is always infected, is thoroughly desiccated, then curetted. The base is then superficially desiccated again. The diseased membrane is by this means thoroughly destroyed and the whole tract sterilized. Reinfection has never been observed, healing is rapid, and a complete cure results.

So many excellent results have been observed that the desiccation method is recommended as a simple yet most efficient method for the radical treatment of the most severe cases of hemorrhoids and anal fissures.

Treatment of Malarial Fever in Individuals Susceptible to Attacks of Blackwater Fever by Intravenous Injection of an Antihemolytic Quinine Solution.

BRAHMACHARI, in the *Indian Medical Gazette* for June, 1921, states that the hemolytic properties of a quinine salt are diminished by the addition of 10-per-cent glucose to the solution of the quinine salt in normal saline.

Quinine alkaloid has very little hemolytic properties, and this author believes that he has proved that a non-hemolytic quinine solution should not contain a quinine salt but the alkaloid itself.

He tried to prepare various solutions of quinine alkaloid without the aid of any acids, and after a very extensive series of experiments he found that the following solution of alkaloidal quinine possesses very marked antihemolytic properties. (It is to be recalled that quinine alkaloid is very slightly soluble in water.)

(1) Quinine alkaloid, 5 grains.
(2) Alcohol, 50 minims.
(3) Urethane, 3 grains.
(4) Calcium chloride, 7.5 grains.
(5) Glucose, 300 grains.
(6) Normal saline, 200 Cc. (.85-per-cent solution of NaCl in distilled water).

The above will give a solution of alkaloidal quinine of the strength of 1 in 600 in normal saline + 10-per-cent glucose.

The following observations show that the above solution is non-hemolytic, while a solution of quinine bihydrochloride containing the same strength of quinine radicle is hemolytic.

(1) 5 Cc. of the solution + 1 Cc. of 5-per-cent suspension of erythrocytes = no hemolysis occurs.

(2) 5 Cc. of a solution of quinine bihydrochloride having the same strength of quinine as in the above+1 Cc. of 5-per-cent suspension of erythrocytes causes hemolysis.

Quinine alkaloid given by the mouth is converted into a salt with hydrochloric acid or bile acids before absorption, and since the quinine salts possess more or less hemolytic properties its oral administration to individuals susceptible to attacks of blackwater fever is objectionable. He considers such individuals should always be treated with the above antihemolytic quinine solution given intravenously.

This solution of quinine alkaloid is alkaline in reaction and is very well borne by malarial patients. If its antihemolytic properties are also exhibited *in vivo,* then he considers that one of the most difficult and vexed problems in malariology will be solved, and many valuable lives may be saved which will otherwise be lost because quinine salts cannot be administered to them on account of their susceptibility to attacks of blackwater fever or because such individuals may develop hemoglobinuria after their administration. He has observed that solutions of salts of quinine lose, to some extent, their hemolytic properties when they contain 10-per-cent glucose and 25-per-cent CaCl, but of all the quinine preparations the above solution of alkaloidal quinine possesses most marked antihemolytic properties.

It is generally stated that in a case of blackwater fever quinine should not be administered if malarial parasites are not found in the blood. But it has to be remembered that the parasites may disappear from the peripheral circulation after administration of a small dose of quinine and be still present in the internal organs. Therefore the problem whether quinine should be stopped or not cannot be determined by the absence of parasites in the peripheral circulation. If, however, the above antihemolytic quinine solution is administered, then the contraindications to the administration of quinine are removed even when blackwater has appeared.

As stated before, the above solution is well borne by malarial patients, and Brahmachari has found that given intravenously it does not lead to such profound fall of systolic blood-pressure as is observed in the case of quinine bihydrochloride. He has sometimes even found that there is a tendency toward a rise of systolic blood-pressure. Frequently there is a rise of diastolic blood-pressure similar to what is observed in the case of quinine bihydrochloride. On the whole, as far as his present observation goes, he has found that circulatory disturbances are less marked in the case of this solution given intravenously than in the case of quinine bihydrochloride dissolved in normal saline.

In order to test whether the hypertonicity of the above solution may lead to any other untoward results, he has found that given intravenously into rabbits it did not give rise to any such effects; 10 Cc. of the solution (=¼ grain of the quinine alkaloid) given intravenously into rabbits weighing 450 to 470 grammes did not produce any ill effect. This will correspond nearly to giving 1200 Cc. of the solution to a man of average weight.

The Colon and Colitis.

Lord Dawson of Penn, in the *British Medical Journal* of July 9, 1921, states that owing to the complexity of its origin and the variety of its manifestations, mucous colitis is difficult to treat. The coarse food rich in cellulose advocated by Von Noorden is not a success. It irritates the intestine, and is prone to produce gas.

The food should consist of light solids—for example, white fish, first cooked meats, dishes made with eggs, light puddings, etc. Soups should be taken sparingly or avoided. Only a little fluid should be taken with the meals, but sufficient between meals. Fruit and vegetables are a problem; they are often difficult to digest, yet from the point of view of nutrition are desirable; mashed potato,

cauliflower, and cooked celery and lettuce agree; and of fruits, apple is the safest.

In intractable cases the limitation of vegetables and fruit has often to be strict, and by some authorities a paste (macaroni) diet is prescribed for a period. The disadvantage of a too restricted diet is twofold—it discourages the patient and is apt to result in an insufficiency of essential foodstuffs and vitamines. The latter may be given separately where foods containing them cannot be tolerated in adequate quantity. Sometimes fruit and even raw vegetable like lettuce can be tolerated if taken alone, whereas they remain undigested if mixed with other food. And generally colitis patients do better by taking only two main articles of food (courses) at a meal.

It is important for the extremities to be warm, and especially before eating.

If the body or mind has been engaged in effort, a few moments of repose and relaxation should precede the taking of food. It will often be found that these patients cannot take vigorous exercise of both body and mind on the same day. A business man is often better with only gentle exercise during the week, reserving his physical exertion for the week-end. Where the patient's abdomen is over-responsive the treatment advised should have regard to that fact. Fatigue, stress, and anxiety must be guarded against where possible. Periodic rests, such as a weekly or fortnightly day in bed, help to secure this end.

A great deal can be done by educating the mind not only to concentrate but to detach and relax quickly. This is an important aspect of treatment. Physical culture holds an established position. Surely psychical culture is of like importance. The power to rest quickly and relax deliberately is essential to those who feel acutely and work strenuously.

Drugs that aid digestion, like taka-diastase and pancreatin, do good. Sleep is apt to be disturbed by distentions of the hollow viscera. Bismuth and sodium bicarbonate with a carminative, and if necessary a few minims of nepenthe, given at bedtime will help this condition.

Aperients should be gentle, and for clearing the bowel castor oil is the best. Very often little aperient is needed if paraffin is taken regularly, though there are patients in whom paraffin is ejected alone and even incontinently. Special care in the use of aperients is needed when bacilluria exists.

An essential indication is to secure the emptying and cleanness of the colon. This is secured by intestinal lavage. Bismuth in bulk (℥ij) administered in bread and milk or jelly taken every week or ten days is often of benefit. It seems to act by scouring the colon. Where there is much fermentation an ounce of wood charcoal may be mixed with the bismuth. Intestinal antiseptics are disappointing.

Where the above measures fail to secure evacuation and cleansing of the intestine, appendicostomy is a sound and safe procedure, and is often productive of considerable benefit.

Sufficient experience has now been gained to pass the operation of colectomy under review.

The results as a whole have not been encouraging. Apart from its magnitude and, therefore, risk, the operation seldom restores to a patient anything approaching a normal life. Patients will express doubts as to whether they have gained enough to have made the operation worth while.

Lord Dawson quotes cases to show that technical and clinical success do not always go together. Further, there are not a few instances in which the operation completely fails in its objects and leaves the patient as wrecked, if not more wrecked, in health than before.

Now and again the results are excellent and succeed where previous measures have failed. He has under observation a case in which a transformation was effected by colectomy, and now, after ten years, the patient continues in good health.

The indications for colectomy would seem to be:

1. Where the motility of the colon is so spent that all other measures fail to prevent stasis within it.

2. Where the colon is so damaged in its defences that, in spite of every effort to keep it cleansed, toxic products get through

in such abundance as to ruin the health of the patient. But here, too, there is risk that the second line of defence in the liver may be damaged also.

Hemicolectomy is on a different footing. The operative risk is small, and if it fails in its object there is little risk of the patient's condition being made worse. If the failure of function is in the proximal colon the prospect of success should be good, especially if the ileocolic valve is preserved in the implanted portion, as has recently been done. Unfortunately, however, there is sometimes too much mischief in the distal colon for the operation to be adequate. When such is the case and a complete colectomy appears to be inevitable, he suggests that it is worth while considering in each case whether colotomy would not be efficient and preferable. The thought of colotomy is, no doubt, in discord with a fine surgical sense, and its performance carries a feeling of disappointment to the surgeon that circumstances do not permit him to do something better. But in relation to this particular problem it has advantages. It is a simple operation, patients achieve a considerable accommodation to its inconveniences, and, if it fails, further surgical procedures are not precluded.

On the other hand, complete colectomy is the last and irretrievable word; it offers but a modest prospect of success, and its failures, not a few in number, are sometimes apt to be such dire failures as to mean for the patients misery and suffering little capable of alleviation.

The Mode of Action of Low Temperatures and of Cold Baths in Increasing the Oxidative Processes.

BURGE and LEICHSENRING, in the *American Journal of Physiology* for July, 1921, state that low temperatures and cold baths produce an increase in the blood catalase of warm-blooded animals and a decrease in cold-blooded animals, in keeping with the fact that cold increases oxidation in warm-blooded animals and decreases it in cold-blooded animals. An increase in the external temperature increases the blood catalase in cold-blooded animals in keeping with the fact that it increases the oxidative processes.

The stimulating effect of low temperatures on catalase production in warm-blooded animals decreases with a rise in temperature, disappearing at room temperature (22°C.), in keeping with the fact that the stimulating effect of cold on metabolism decreases with a rise in temperature. Baths at 35°C. produce no increase in oxidation in warm-blooded animals, and it is shown in this paper that such baths do not increase catalase.

The increase in oxidation in warm-blooded animals on exposure to cold is attributed to an increase in catalase, and the decrease in oxidation in cold-blooded animals on exposure to cold to a decrease in catalase. The increase in oxidation in cold-blooded animals occurring with a rise in external temperature is attributed to an increase in catalase.

Lung Mapping by the Injection of Bismuth Mixtures in the Living.

LYNAH, in the *New York Medical Journal* of July 20, 1921, in summarizing his article on this subject, states that bismuth mixtures can be injected into the bronchi and lung of the living without doing harm.

The injection of opaque substances into the lung of the living will open up an enormous field of usefulness in the study of cough, the expulsion of secretions from the lung, and lung drainage. It will also localize bronchial strictures in the same manner as seen in the esophagus. Furthermore, it will be of the greatest aid to the thoracic surgeon by mapping out the abscess cavity in the correct lobe of the lung on which he is to operate.

A definite lung abscess cavity is seldom seen bronchoscopically. Pus is usually seen coming from a small branch bronchus, and the abscess cavity may be well around a corner and not in a direct line with the bronchus from which the pus is oozing. An injection of a bismuth mixture or some

other opaque substance will clear up this error.

Bismuth when it enters the abscess cavity is interpreted in the radiographic plate by its metallic luster, and when it is in the lobular lung structure it is interpreted by its dull opacity. Pus diffuses and soaks the lung structure, and this often makes the involved area appear many times larger than it really is.

The amount of bismuth injected in these patients was an 8-Cc. mixture of bismuth subcarbonate in pure olive oil, one in two and one in three. The mixture is made sterile by boiling before injection.

The injection should be made slowly and not with a squirt, for the picture may be spoiled by bismuth lung soaking.

From these preliminary studies it seems that cough and the action of cilia may not be the only means of expelling secretion from the lung.

While bismuth mixtures were originally injected by him for purposes of lung mapping of abscess cavities in their proper lobes, it seems to have been of benefit to the two patients in whom it was tried. So far it has done no harm.

Experimental Studies of the Pharmacology of Quinidine.

The *Medical Record* of July 23, 1921, in abstracting the paper by Cohn and Levy on this subject read before the Association of American Physicians recently, states that they quoted one patient who said that his cardiac attacks (auricular fibrillation) were stopped by taking quinine. It was tried on other patients, with success in some cases. Other derivatives of the drug were studied in order to stop fibrillation. Quinidine gave success in 50 per cent of cases. Experimental studies on dogs showed that contraction of the auricle became less, and that with faradization after quinidine dosage one could not start fibrillation. Other effects noted were increase of height of contraction and fall of blood-pressure in the peripheral arteries. There were no constant results on the T-wave or on the conduction time. The conclusions were that there seemed to be an alteration in the muscle which made it refractory to faradization as regards fibrillation, and there was a striking effect on contraction. These are artificial experiments, not likely to be carried into the clinic. Experiments are now being made as to the effect of the drug on the fibrillatory process.

Dr. Cohn, in closing the discussion on his paper, said that the dose of this drug clinically was one of 0.2 to 0.4 gramme, to test for drug idiosyncrasy, and then administration at half-hour intervals of 0.4 gramme doses by mouth, and usually the effect had been obtained by a total dosage of 1.2 grammes.

The Deleterious Effects of the Bromide Treatment in the Diseases of the Nervous System.

HUNT, in the *Medical Record* of July 16, 1921, states that the symptoms of bromidism are twofold: (1) Physical, and (2) mental.

1. The physical symptoms are the rash, the coated tongue, and fetid breath; constipation, cachexia, feebleness, and excessive flow of saliva; and, if the condition is aggravated, an ataxic gait, a loss of patellar reflexes, tremor, and an ataxic speech.

2. The mental symptoms are restlessness, insomnia, depression, later excitability, confusion, delusions, and hallucinations.

The conclusions to be reached from this little study are:

1. That bromides are very far from harmless.

2. That their prolonged administration will give rise to both physical and mental symptoms, the latter a condition akin to paresis.

3. That they tend to aggravate the irritability and mental deterioration in long-standing cases of epilepsy.

4. That toxic cases develop more rapidly upon the administration of bromide.

5. That circulatory, traumatic, and arterial cases are peculiarly susceptible to their administration.

6. That bromide may mask the symptoms of mental disease just as thoroughly as does opium in surgical conditions.

7. That mental and alcoholic cases are peculiarly susceptible to bromidism.

A Valuable Method of Treatment in Selected Cases of Syphilis.

GUY, in the *American Journal of Syphilis* for July, 1921, states that syphilis should not be treated by rule of thumb. Generalization will lead to disaster. One must treat a patient as well as a disease. Certain cases will not tolerate intensive treatment, and there are those in which a more conservative therapy is not effective. Treatment should be individualized, at the same time holding as closely as possible to certain fundamental principles. Treatment must be long continued—on that point every one is agreed—the only exception being in early primary cases in which one may abort the infection by intensive therapy. The fact that nearly all syphilographers treat primary syphilis intensively strengthens his personal opinion that this should be the method of choice, regardless of the stage of the disease, provided the patient is physically fit. We are dealing with a constitutional infection in which a cure is obtained only when every spirochete has been destroyed. In late syphilis inaccessibility of the organism, either in tissues with poor circulation or in masses of comparatively avascular granulomatous infiltration, makes a therapeutic victory more difficult. With iodides to act as resolvents of infiltrations it seems logical to believe, as pointed out by Pollitzer, advocating administration of arsphenamine daily for three days instead of less frequent injections, that the hidden spirochete will much more likely receive a lethal dose of arsenic if the blood stream is kept continuously saturated with the drug as long as is compatible with safety.

That the method is not particularly dangerous is attested by the fact that many hundreds of injections have been given successfully in this way. The plan is based on the idea that arsphenamine acts as a direct spirocheticide; if such is the case, the method is sound; if the drug acts indirectly as a tonic, gradually building up to overcome the infection, then it is wrong. Pollitzer and those others who have used the method have seen a positive Wassermann, persisting under less intensive therapy, promptly reversed. Pollitzer gives arsphenamine on each of three successive days, and follows this with a course of mercury, after which he institutes a therapeutic rest. In selected cases he has used the following modification with gratifying results. He gives 0.1 gm. arsphenamine for each 30 pounds of body weight on each of three successive days. This is repeated after one month, and again after the same interval. In selected primary cases he occasionally gives the second three injections of arsphenamine after an interval of two weeks. His patients are also kept saturated with mercury during this same period, either soluble or insoluble salts being used intramuscularly, dosage being estimated according to the tolerance of the individual. Thus, using, for example, the salicylate of mercury, a course would be recorded approximately as follows:

Male—weight 150 pounds.
Jan. 1—Arsphenamine, 5 gm.
Jan. 2—Arsphenamine, 5 gm.
Jan. 3—Arsphenamine, 5 gm.
Jan. 6—Hg. salicylate, 1 gr.
Jan. 13—Hg. sal. gr. 1.
Jan. 20—Hg. sal. gr. 1¼.
Jan. 27—Hg. sal. gr. 1¼.
Feb. 1—Arsphenamine, 5 gm.
Feb. 2 "
Feb. 3 "
Feb. 6—Hg. sal. gr. 1¼.
Feb. 13—Hg. sal. gr. 1¼.
Feb. 20—Hg. sal. gr. 1½.
Feb. 27—Hg. sal. gr. 1½.
March 3—Arsphenamine, 5 gm.
March 4 "
March 5 "
March 8—Hg. sal. gr. 1½.
March 15—Hg. sal. gr. 1½.
March 22—Hg. sal. gr. 1½.
March 28—Hg. sal. gr. 2.

Upon completion of the course a therapeutic rest of approximately eight weeks is given, after which rest the course is repeated except in those cases in which the dark field is positive, and the Wassermann reaction negative. In addition to avoiding the development of an arsenic and mercury fast

strain of spirochete, one allows time for recuperation from the intensive treatment, and further is able to obtain a serological check just before beginning the next course that more nearly represents the condition of the blood than one obtained while the patient is on active medication. Three such courses are given in the average case, the amount of medication obviously being varied in different individuals. Also it is occasionally necessary even in selected cases to materially modify the plan. Progressive loss of weight, anemia, evidence of renal irritation, etc., are examples of such indications. In a few cases he has used continuous medication, alternating with mercury and arsphenamine, and his rather limited experience with this modification leads him to favor the plan of intermittent therapy. He has given approaching 500 injections of arsphenamine by this method (daily for three days) without serious trouble. It is essential that the technique used shall conform to known standards, and that the patient be a young vigorous adult in first-class physical condition.

Surgical and Genito-Urinary Therapeutics

Reconstruction Operation of Ununited Fracture of the Neck of the Femur.

WHITMAN (*Surgery, Gynecology and Obstetrics,* June, 1921) observes that the results of fractures in general are determined primarily by the efficiency of the treatment in correcting deformity and in apposing displaced fragments; and that the greater the obstacles to repair, whether mechanical or nutritive, the more directly is success dependent upon favorable opportunity. It follows, therefore, that the exceptionally bad results that distinguish fracture of the neck of the femur from all the other injuries of its class are due primarily to the inadequacy of conventional treatment to assure the essentials of functional repair.

Non-union, which is the rule, if the fracture is of the central type, is caused primarily by separation of the fragments. These are of small area lying in a lateral relation to one another. They can be apposed therefore only by placing the limb in the attitude of full abduction, because the fragments are thus brought end to end, so that security may be maintained by mutual pressure. Accurate adjustment and secure fixation are in this instance essential to repair, because it must proceed from the interior unaided by external callus.

In fractures at the base of the neck, the larger area of the fragments and the better blood supply favor repair.

At the hip the range of motion is determined by the angle of the neck of the femur. If the angle is lessened, abduction is correspondingly restricted by contact of the upper border of the neck with the rim of the acetabulum, or if the neck is materially shortened, by impact of the trochanter at this point. If its forward inclination is lost, the limb is rotated outward and the range of flexion is restricted.

Depression and backward distortion of the neck (coxa vara) is the characteristic primary and persistent deformity of the "extracapsular" fracture, since it is rarely corrected by design or incidentally by treatment. This deformity causes direct and apparent shortening of the limb; for since the range of abduction is insufficient for functional requirements, it is supplemented by a tilting upward of the pelvis on the affected side.

Repair of fractures in this region is very slow, and because of its projection from the shaft the neck of the femur is subjected to greater strain than are other bones. Furthermore the joint is often involved in a form of sympathetic arthritis, as indicated by sensitiveness to weight-bearing, to

passive movements, and by restriction of voluntary motion by what is called muscular spasm, the most significant indication of instability of repair.

If functional use, particularly weight-bearing, is permitted before the fracture is consolidated, the primary deformity may be increased as in the progressive stage of coxa vara, or it may induce excessive callus formation without or nutritive changes within the joint. Furthermore, whenever the injured part is unequal to the strain put upon it, the limb instinctively assumes the attitude of protection, namely, adduction and flexion, and muscular contraction and shortening increase and confirm the distortion.

Lack of protection, which is characteristic of conventional practice, is therefore one of the important factors of what is now considered inevitable disability.

Ununited fractures fall below the standard of the average disability. In most instances crutches are required in locomotion. There is usually discomfort on changing from rest to activity, and often severe pain at night, caused apparently by friction or interlocking of the fragments. Occasionally the capsule or the fibrous union or the interlocked fragments may be sufficiently resistant to assure stability, but there is usually a tendency to further displacement with consequent increase of functional disability. As a rule the discomfort is the greatest in the cases in which the fragments are fairly apposed, thus offering an opportunity for friction; the disability is most marked when they are widely separated by upward displacement of the shaft upon the pelvis with consequent distortion of the limb.

Operative treatment offers the only prospect of definite relief, but thus far it has been practically limited to attempts to secure direct union of the fragments. In this operation the essentials of success are that the neck be long enough to permit a sufficient range of abduction, and that on removal of the fibrous tissue the surface of each fragment shall bleed freely. Under these conditions, if they are accurately apposed by abducting the limb to the proper degree and fixed by a bone peg, union is fairly certain, indicating that if the abduction method, the only efficient means of treating this fracture, had been applied originally the secondary operation would have been unnecessary.

In a large proportion of the cases this treatment is impracticable because the patients are not seen until long after the injury—when the neck fragment has practically disappeared and when the circulation has been greatly reduced by the atrophy of disuse. Furthermore the treatment must be adapted to the individual as well as to the local condition. The majority of the patients are elderly subjects who are often mentally as well as physically depressed by a painful disability of long standing. If an operation is to be undertaken, they desire above all the assurance of relief from discomfort, and restoration of weight-bearing capacity in a definite time. The limb is atrophied, the circulation is poor, and the joints often stiffened from disuse—secondary repair is a very slow process; the outcome is uncertain and the functional result imperfect because of the degenerative changes involving the components of the joints.

In the great majority of cases direct union is doubtful, and thus far the alternatives have been to remove the head of the femur and either to implant the upper extremity of the shaft in the acetabulum, or to cut through the trochanter and force it outward sufficiently to permit a more complete enclosure of the extremity of the neck in the acetabulum. The trochanter being ill adjusted to the acetabulum is liable to displacement if motion is permitted, and in both instances there is complete loss of leverage for the abductors, therefore lessened muscular control and a consequent tendency toward flexion and adduction of the limb.

The procedure that the author presents is called a reconstruction operation, because it is designed to restore, as far as may be, the mechanical conditions required for security and controlled movement.

An incision is made in the shape of a half U, beginning about 1 inch behind the anterior superior spine and extending downward and backward, crossing the femur at a point 3 inches below the apex of the trochanter. The interval between the tensor vaginæ femoris and gluteus medius muscles is exposed; the capsule is opened and the head of the femur is removed.

The anterior margin of the gluteus minimus is followed to its insertion, and at this point, with a wide, thin chisel, the base of the trochanter is cut through in an oblique direction corresponding to the angle of the neck, including all its muscular attachments and often a part of the capsule. This flap of bone and muscle is turned upward, and the upper extremity of the femur, having been somewhat remodeled by cutting away the projections of the posterior intertrochanteric line, is freed from any restraining tissues and is thrust completely within the acetabulum at an angle of about 25 degrees of abduction.

The trochanter is then drawn downward, as far as its attachments will permit, and sufficient cortex having been removed from the lateral aspect of the femur, the two bare surfaces are apposed, the axis of the trochanter being thereby changed from a direction upward and inward to outward and upward. In this position it is secured, either by a drill or a peg, but usually by suture passed through the bones. The wound is closed in layers and a long plaster spica is applied fixing the limb in extension and abduction. When repair has sufficiently advanced, or in about four weeks, this may be replaced by a short spica, and patient is encouraged to bear weight in order to hasten the reconstruction of the articulation by a functional adaptation of the limb to the new conditions. When weight may be borne without discomfort, the support is removed and muscular control is reëstablished by systematic exercises.

The reconstruction operation is designed primarily for cases of ununited fracture in which bone grafting seems impracticable, a class which under present conditions includes the majority of all patients. The immediate and efficient treatment of fracture of the neck of the femur by the abduction method will be followed in most instances by repair, and if union fails when accurate apposition of the fractured surfaces has been maintained for a sufficient time, as confirmed by *x*-ray examination, it indicates a low vitality of the tissues, and therefore the advisability of the reconstruction operation in preference to bone grafting.

At the present time only a small proportion of the patients are treated efficiently at the time of the injury, and the field for both bone grafting and the reconstruction operation is much greater than it will be in the future.

It may be mentioned, in conclusion, that this type of operation is serviceable for other conditions than ununited fracture. For example, as a substitute for the arthrodesis in advanced arthritis deformans; for restoring motion in cases of ankylosis, particularly of the bilateral form, cases in which plastic operations are usually disappointing either because the joint again becomes fixed, or because of discomfort and eventual distortion of the limb; also in certain cases in which as the result of destructive disease of the joint there is upward displacement of the shaft.

Treatment of Gastric Ulcer.

SMITHIES *(International Journal of Gastroenterology,* July, 1921), after a brief summary of the histological, physiological, and clinical investigations bearing on the etiology of gastric ulcer, states that the principle involved in the treatment of this lesion first demands search for and eradication of the primary systemic fault. Often the localization of such is difficult. Inasmuch as foci of infection may exist in oral adenoid tissue, head sinuses, about teeth or in systemic lymph gland chains, these must be removed promptly. Intra-abdominal infections must likewise be eradicated, *e.g.*, diseased appendix, gall-bladder, Fallopian tubes, ovaries, ulcers, or subinfections of the bowel. It would appear quite inade-

quate to remove external local foci of infection and to leave behind intra-abdominal foci containing bacteria already accustomed to their environment, and ready to spread their operations to the gastric lining when opportunity offers. The removal of these variously situated germ centers constitutes a fundamental step toward the cure of gastric ulcer.

After local foci of infection have been removed, the mode of treatment is further influenced by the type of ulcer that has been proved to exist. Unless ulcers with much scar or causing great gastric deformity are demonstrated to be luetic, little hope of permanent relief by medical measures can be offered. Surgery gives the greatest prospect of relief to such cases. Intense pain, frequent hemorrhage, perforation or the danger of malignant change taking place in calloused ulcers likewise contraindicate nonoperative care. Unfortunately we have no clinical or laboratory tests which indicate to us what type of ulcers will become malignant, or when early malignant change is taking place. The Roentgen demonstration of calloused ulcer exceeding 2 cm. diameter, when such is associated with history of frequently recurring ulcer symptoms and positive chemical test for blood constantly determined in the stools, forms a clinical hint that malignancy can be expected. The most competent clinicians are agreed that calloused, recurring ulcers, located in the pyloric end of the stomach, should be treated operatively. Excision should be performed, when mechanically possible. If excision is impracticable, then infolding, or cautery puncture, with or without gastrojejunostomy, yields the most satisfactory results. In non-obstructing ulcers gastrojejunostomy should always be accompanied by permanent pyloric closure.

Medical treatment is indicated only for ulcers associated with little callus, or for those located in portions of the stomach in which stenosis is not liable to result and surgical procedures cannot be carried out.

Smithies advises in the conservative treatment rest in bed for one to three weeks; physiologic rest for the stomach; abstinence from food for from three to seven days, according to the case. The period of fast is determined best by clinical disappearance of gastric spasm. During the fast paraffin wax is chewed for fifteen minutes every hour; local applications to the abdomen, compresses saturated with alcohol and boric acid solution. Rectal feeding during the fasting period, using enemata containing one ounce of 50-per-cent alcohol; 1 ounce of glucose with normal salt solution to make 240 Cc. The nutrient enema is given at body temperature by the drop method; the drops flow at the rate of 30 to 60 per minute. During the first day of rectal feeding, gtt. x of tr. opii are given with each enema.

Food when given is in liquid form, warm, and in small quantities frequently repeated; barley water, rice, gruel, thin cream of wheat, thin creamed vegetable soup. Milk is not given as a rule because of its clotting and the fact that it remains longer in the stomach. The value of any medicine is doubtful. Sodium carbonate may come in serviceably at times. During the early period of treatment simple soap-suds enemata administered every second day, later on bland salts, may be given and liquid paraffin with equal quantities of warm cream. When lues is suspected vigorous specific therapy is indicated. Anemia when present is treated in appropriate fashion.

Enuresis.

CARTER *(Archives of Pediatrics,* May, 1921) after alluding to many forms of treatment, including disciplinary on the part of parents, outlines the management of these cases as follows:

All local morbid conditions should be discovered and corrected, not entirely because they may be etiological, but because their elimination is the proper thing to do for the general health of the child. Foci of infection, such as may be placed in tonsils and alveoli, should be removed. An adherent prepuce requires operation. There is no indication however for a circumcision just because the foreskin happens to be long. If it retracts easily, it should be left alone. Highly acid urine should be neutralized or

reduced in acidity by the administration of potassium citrate. This drug should be administered in 5- or 10-grain doses, every two hours, until the urine causes a strip of pink litmus paper to turn blue. Intestinal parasites, if they be present (and they are rare in American cities at least), should be expelled by appropriate drugs. Constipation should be overcome. High concentrations of urine should be corrected by giving plenty of water during the earlier hours of the day.

With all possible contributing factors removed, the major treatment of enuresis should be directed toward the training of the nervous system. As a requisite for undertaking treatment, a promise should be exacted from the mother or attendant of whole-hearted coöperation, for without this assistance treatment will be of no avail. It is perfectly useless to expect help from parents who are themselves so neurotic that they cannot bear to impose any sort of discipline on their offspring.

No fluid is permitted after a given hour in the afternoon. The child is taken up at regular intervals, thoroughly wakened, and directed to urinate. He is instructed to stop and start urination on order. The author states that diurnal control of the bladder should be completed not later than the eighteenth to the twenty-fourth month. A child of 2 or 2½ years old, who habitually wets his clothing during the day and the bed during the night, cannot be said to be well trained. Experience has shown there is little need for drugs.

Sacral Anesthesia as Applied to Genito-urinary Surgery.

SYMS *(International Journal of Surgery,* June, 1921) observes that local anesthesia in the neighborhood of the anus by the local infiltration method is dangerous, as the region cannot be adequately sterilized. Sacral anesthesia is devoid of that danger.

Before one attempts this procedure it will be necessary for him to familiarize himself with the anatomy of the sacrum, for the injection is to be made into the sacral canal. The orifice or entrance to the sacral canal is found at what is known as the hiatus sacralis. This hiatus is formed by the absence of the last spinous process, and practically it may be recognized by two prominences or cornua which are found one on either side of the opening. The hiatus is closed by a dense fibrous membrane which is stretched like a drumhead over the orifice. Usually the hiatus may be recognized by palpating the two bony prominences above mentioned. Of course, it is to be found a short but a variable distance above the upper end of the coccyx. If the coccyx is movable it will be easy to locate its upper end and thus the lower end of the sacrum. If the two bones are ankylosed, it may not be so easy, but there is always an angle at the point of junction, and this will help us in searching for and finding the bony cornua and the dimple between them which represents the hiatus.

The patient is placed in a prone position. A pillow under the pelvis will help. By careful palpation the essential anatomical points are recognized and located; the region is painted with iodine; a small amount of novocaine solution is infiltrated in the superficial structures. Then a two and a half or three-inch sharp-pointed needle (non-breakable) is introduced into the hiatus, plunged through the drumhead membrane, and then pushed a short distance further in the line of the canal.

Usually one can feel the needle plunge through the dense membrane which closes the canal. After this membrane is penetrated, the needle should not be introduced much further; 2 or 3 centimeters are sufficient. Thompson has found that the lower end of the dura is on an average 5.8 cm. from the hiatus—the shortest was 4 cm., the longest 7 cm. The needle is introduced detached from the syringe. If spinal fluid should appear, the needle should be slightly withdrawn until the fluid stops flowing. If blood should flow through the needle, one should assume that he has penetrated a vein, and the needle should be slightly withdrawn. Being assured that it is in the canal, one connects up the syringe

and proceeds to inject the 30 Cc. of solution. If the needle is properly in the canal, there will be practically no resistance to the flow of the fluid. It will be as though one were injecting into space.

Anesthesia should be complete in the region of the anus within ten to twenty minutes, and in other areas of this region within a variable period, ranging from ten to thirty minutes. The anesthesia lasts several hours, as it is better to wait long enough rather than to begin too soon.

The region anesthetized is about the area which sits on a saddle—in other words, the region around the anus, the perineum, the scrotum, and later the penis. Sometimes anesthesia extends up as high as the umbilicus, but this cannot be relied upon.

One of the supreme tests of complete anesthesia is the dilating of the sphincter ani. With sacral anesthesia one may fully dilate the sphincter, clamp and burn off with the cautery large hemorrhoidal masses without having the patient flinch or show the slightest sign of pain.

The advantages of this method are obvious. It seems to be free from risk. It enables us to operate with the same freedom as we would if we used a general anesthetic, and yet it is free from all disturbance to the patient and all the dangers that attend general anesthesia. This method has all the advantages of local anesthesia, and yet it is free from its dangers in an area which cannot be surgically sterilized.

It enables us to perform the radical operation for hemorrhoids in patients to whom we do not care to give a general anesthetic. Thus we are not prompted nor tempted to perform the so-called minor or tinkering operations, which are after all more dangerous than the radical operation performed with the clamp and cautery.

It takes some patients out of the inoperable class, notably those suffering from pulmonary diseases, and those with impaired circulation, with cardiovascular and renal conditions, which would otherwise make them unsafe as surgical risks.

It presents one more reason, if any were needed, why prostatectomy should be performed by the perineal route. Some seriously ill patients have been able to undergo the operation without shock or depression, and as their bladders were uninjured and were continent, they have been able to be up and about twenty-four hours after the operation, and some of them have been able to leave the hospital within five days.

As sensation returns very slowly and the anesthesia lasts many hours, gradually wearing off, patients suffer much less from postoperative pain and discomfort than they do with other forms of anesthesia.

The author has used this method with success and satisfaction in operations in the region in which it is applicable. Among these are: Hemorrhoidectomy by the clamp and cautery and other methods; operations for fistula in ano; for rectal fissures; for opening ischio-rectal abscesses.

In its application to genito-urinary surgery he has used it in perineal prostatectomy; in perineal section for bladder drainage; in external urethrotomies with and without a guide, and for opening prostatic abscesses; in various operations on the scrotum, such as hydrocele and variococele; and in circumcision in the adult.

Treatment of Cutaneous Anthrax.

Ogilvie and Hall *(British Medical Journal,* June 18, 1921) report cutaneous anthrax in 48 cases, this subject having been revived by repeated cases occurring from the use of shaving brushes. They quote from a circular issued by the Ministry of Health, January, 1921, to the effect that of 200 cases treated by serum only 4 per cent died. Of the 397 cases treated by excision only 11 per cent died; of 174 cases treated by excision and serum 14 per cent died; and of 29 cases in which there was no special treatment 48 per cent died.

At Guy's Hospital treatment was based on excision plus serum. Of four cases treated by serum alone, the mortality was 25 per cent; 6 of excision alone 16 per cent; 37 of excision and serum 8 plus per cent.

The authors hold that it is probable that the series from Guy's Hospital, though

small, gives a fair picture, and that the death-rate when both methods are combined is notably lower than when either is used alone. In the early stages of anthrax the bacilli are limited to the pustule and its immediate neighborhood. Excision by itself will assure a cure in about 90 per cent of cases in a disease having a natural mortality of something like 50 per cent, while serum at best cannot be relied upon to avoid a fatal issue in all cases. In view of the danger of anthrax and the local nature of the infection in the early stages, it therefore appears to be the wiser course to combine the two methods, which are both known to be good and which cannot be mutually antagonistic, and thus to give the patient every chance. Little or no importance should be attached to the resulting scar. The combination of excision and serum treatment as used at Guy's Hospital is probably the most rational and the safest course in all cases of cutaneous anthrax which have not reached the stage of a septicemia.

As to the treatment of persons infected, the circular issued by the Ministry of Health is quoted as follows:

"In general, the best treatment for a case of anthrax is physiological rest of the part affected, combined with intravenous injection of antianthrax serum; 60 to 80 Cc. on the first day, and 60 Cc. on the day following if there has been no reaction (shown by a rise of temperature) and the general condition has not improved. Excision is unnecessary. Subcutaneous injection into the abdominal wall of 30 Cc. has apparently been successful in many cases, repeated, if necessary, on successive days."

Treatment of Burns.

Writing on this subject COLCORD *(International Journal of Surgery,* June, 1921) states that there are two kinds of burns that are so different from all others that he would especially call attention to them. First, the ultraviolet-ray burn. The effects of the ultraviolet-ray burn begin about six hours after it is inflicted. The *x*-ray burn effects are not seen for two or three weeks after infliction.

He speaks of the causes of death as being due to what is termed shock if it occurs in twelve hours. After three days it is probably due to an overwhelming dose of the toxalbumins and emboli which have reached the vital organs. He says he has never seen but one case of edema of the glottis from breathing in the flame. It is the same with the eyes: There may be a flash of flame from the furnace with a tongue of flame. It is pretty hot for a few seconds, and the man's face is burned, his eyelashes are burned off and eyelids burned, but his cornea is not burned. Paraffin treatment receives first choice. The writer strongly advises an ointment made up of carbolic acid, thymol, menthol, camphor, of each 5 grains; ichthyol, balsam of Peru, of each 10 grains; zinc oxide, starch, of each 1½ drachms; petrolatum to make six ounces. Mix well.

He has treated over 2000 burns with this ointment, and is convinced it has the following advantages: It is an efficient germicide and not only renders the surrounding skin relatively sterile, but also keeps the discharges and burned surfaces approximately free from germs and, therefore, free from pus. The only cases in which there is pus are in those who take off their own dressings and so infect the burn; those who come after several hours or days with burns already infected; those burned near the mouth, nose, or hair, or near the buttocks in babies; those suffering from bad sloughing burns of the third degree. The latter are treated as soon as a slough begins to form with continuous wet dressing of Ochsner's fluid, which prevents bad odor or pus.

This ointment is a powerful local anesthetic and soon stops pain, especially in burns of the first or second degree. A badly burned baby, screaming with pain, will often go to sleep from the relief afforded before the bandages are all on.

It is a deodorizer. Cases of burns dressed with it have no bad odor except badly sloughing third-degree ones, and the odor is best controlled by the wet dressing.

It is non-poisonous; there has been no case in which absorption of the drug has produced any unpleasant symptoms.

It is easily and quickly applied and convenient to carry in the grip.

With this ointment, dressings do not stick as they do with picric acid and many other applications. Men with slight burns can work in comfort.

It is especially adapted to mill and office practice, where we do not have the perfect cleanliness of the hospital, and where the open-air (Sneve) dry method or the continuous bath is impracticable. It is the only method that will keep a burn clean in the dirty homes of some of the foreigners working in the steel mills.

The recovery is much more rapid by this method, because the edema and inflammation of the skin soon subside; there is no pus; granulation and epidermis formation is stimulated.

There is less scarring because less destruction of tissue.

Some years ago the reporter treated 30 cases with picric acid; there was a general demand from these patients that he return to the ointment.

The two essentials of this ointment are: A paraffin of medium melting point—about 105°; the deodorant-anesthetic-antiseptic made by combining four crystals to form one new chemical substance.

The author imagines he is called to treat a severe burn of the second degree. He at once administers a hypodermic of ¼ to ½ grain of morphia and 1/100 to 1/50 grain of atropine to stop pain and apprehension and combat the shock. The room should be warm—80° to 85°—cleared of unnecessary furniture and bystanders, and hot-water bottles or hot bricks should be ready. Preparations should be made for hypodermoclysis or a Murphy enema.

It must be borne in mind that in every bad burn three things are more important than the local treatment: Stop pain; combat shock; provide for dilution and elimination of the toxins, which at once are thrown into the blood.

The clothing should be carefully cut away—never pulled off or dragged over the burned area. A burn is, at first, sterile; it should be kept so.

Pieces of gauze of convenient size are now spread thickly with the ointment and applied somewhat beyond the burned areas. Over this cotton is placed; and over all a bandage. The patient is put to bed, and if shock continues the normal salt solution should be repeated every eight hours, giving plenty of water to drink. Nourishment for the first three days should be liquid on account of the intense congestion of the alimentary tract. Then we may gradually feed according to conditions.

The Clinical Application of Blood Chemistry.

STIER and HOLLISTER *(Northwest Medicine,* June, 1921) give a description of their procedures. By chemical means one is enabled to give a proper valuation of a case where some kidney insufficiency exists, be it in a nephritis or diabetes.

Retention of the products of metabolism takes place in the order of their solubilities. Therefore, uric acid, the least soluble and most difficult constituent to be excreted, is the first to be retained. Above 3 mg. per 100 Cc. represents a retention. Urea comes next in solubility, and a content above 15 mg. per 100 Cc. represents a retention. The most soluble is creatinine, and all values above 2 mg. per 100 Cc. represent a retention. Because it is the last of the products to be retained, it is invaluable from a prognostic standpoint, all figures above 5 mg. usually terminating fatally in from but a few days to two months.

Blood-sugar values above 120 mg. per 100 Cc. denote a hyperglycemia, and in cases of diabetes indicate active diet to bring the values to as normal a figure as possible. An acidosis exists when the acidity of the blood is threatened, as indicated by the failure of the carbon dioxide to combine with the patient's blood plasma. When values fall below 50 per cent an acidosis exists.

In surgery blood chemical methods are

particularly applicable in elderly applicants for operation and in young individuals, in whom some kidney lesion exists. Preliminary flushing of the kidney and other preparations, together with a suitable anesthetic, will do much toward reducing our mortality.

Since we have exact methods of establishing a diagnosis and prognosis, we owe it to our patients to give them the benefit of these scientific determinations.

Treatment of Urinary Incontinence by Electrical Methods.

HERNAMAN-JOHNSON *(Lancet,* June 18, 1921) observes that when ordinary treatment fails in this disease parents are often told that the symptoms will disappear with the onset of puberty. The author asks how many young men who inexplicably refuse invitations, who are "curious" in their behavior, who shun the society of the other sex, are thus afflicted? The late war showed that of apparently healthy recruits, in all countries and from all classes, an unexpectedly large percentage were afflicted with functionary urinary troubles. Yet in private practice the condition seems rarely met with among otherwise healthy adults.

It is stated the two things most likely to be productive of incontinence are stone in the bladder and scybalæ in the rectum. Treatment by drugs and suggestion are dismissed without large belief in their efficacy. Electrical treatment receives warm commendation. Interrupted currents are employed to produce rhythmical contraction of the abdominal muscles; the condenser electrode is inserted per rectum. In this case the patient feels nothing, but a spark may be drawn from any part of his body. These methods both aim at increasing local and general tone. They should always be employed for some weeks before anything more drastic is contemplated. For the first week or ten days the method should be unaccompanied by any verbal suggestion, other than an initial explanatory statement in the case of older children. These should be told that the brain controls the bladder even during sleep, provided that it gets proper messages as to the state of affairs there; and that the effect of the electricity will be to increase the strength of the message—"to make the telephone bell ring more loudly."

If there is no improvement within ten days a definite suggestion should be made to the effect that, although the bladder is not yet strong enough to hold its water all night, yet its distress signals will wake the patient before an accident happens. This is often successful, even though previously, without the use of electricity, the suggestion may have been made in vain. (The kind of suggestion here referred to is, of course, ordinary "waking suggestion" and persuasion; hypnosis should not be employed, except by experts in the subject). If the patient can be got to wake regularly feeling a desire to micturate, the battle is practically won, and in most cases undisturbed nights are ultimately arrived at. When it is not possible to get the child to wake as the result of sensation from his bladder, an alternative is to have him awakened at certain fixed hours for the purpose of making water. This is generally best accomplished by posthypnotic suggestion, and is probably not made any easier to accomplish by electrical treatment, which latter aims at increasing the intensity of the natural call.

Internal methods of electrical application are unpleasant and sometimes even painful. In unskilled hands they may be dangerous. The simplest method is to introduce a metal bougie into the bladder and pass a faradic current through it up to the patient's limit of tolerance. The risks are no more than such as are involved when any metallic instrument is passed into the bladder. A second method is to fill the bladder with a weak solution of zinc sulphate and pass into the bladder a rubber catheter containing a wire of soft metal. Care must be taken that the metal does not at any point come into contact with the wall of the bladder or the urethra. A current of 10 to 15 milliamperes is then passed for ten minutes, the wire being positive; a pad is placed under the buttocks to form the negative pole. This

proceeding may be repeated every other day for a fortnight.

The above mentioned methods increase sensibility as well as tone. They ultimately produce a certain amount of soreness which may aid in stimulating the patient's attention.

As to prognosis, on the whole, the cases in which the trouble comes on in apparently healthy children at the age of four or five are the most difficult to cure; but it should be possible to get a satisfactory result in at least 50 per cent of such cases, even when various other methods have failed. The backward child, physically and mentally undeveloped, benefits in a remarkable manner from the general effects of electricity, unless there is some actual congenital defect. The cure of the incontinence may, however, be delayed—the child has first to be brought to a stage of mental development where he can coöperate with the physician. The change in the physical and mental outlook of such little patients after a few weeks' treatment is often most gratifying.

The time required to effect a cure in a favorable case is about a month, the patient being seen four or five days a week. A case which is definitely benefited but not cured in four weeks may require a further month to banish the trouble. On the other hand, if no improvement takes place in a month, it is best to have the case treated by hypnosis, either alone or in combination with some electrical precedure which has not previously been used.

At the Cambridge Hospital, Aldershot, during the war, statistics were worked out for several hundred cases; 65 per cent were cured—*i. e.*, they were reported as free from trouble a month after their return to their regiments. But these patients were all otherwise well-developed lads of between nineteen and twenty. Taking all types of patients, at all ages—which in his private practice have ranged from 3½ to 27—the percentage of cures to be counted on is over 50, but probably less than 60. This is a conservative estimate. One's results improve with experience, and, without being unduly optimistic, it is permissible to expect that in future it will be possible to attain success in three out of every four such cases.

Fifty Cases of Hour-glass Stomach.

THOMAS *(British Journal of Surgery*, July, 1921) reports fifty consecutive cases of this deformity.

The most noticeable feature was the long duration of symptoms before surgical aid had been resorted to—with the exception of three patients, whose symptoms had only lasted one, two, and three years respectively. All the others had complained of gastric trouble for periods varying from five to thirty years; taking an average, it worked out at nine years, and most of the sufferers had been under medical treatment intermittently throughout.

In no single patient had malignant disease supervened, which, although suspected in two cases, was disproved on operation.

It had not been possible in a single case definitely to diagnose bilocular stomach by ordinary methods, radiography being essential.

Two cases (in addition to the four perforated ulcers) had been previously operated upon—one by gastroplasty and one by posterior gastroenterostomy — though another one had had the gall-bladder drained (no stone found), the symptoms having suggested biliary colic.

From this series of cases it appears that the acute hemorrhagic variety of gastric ulcer rarely leads to this deformity, but rather the chronic ulcer on the lesser curve with many years' history of a continuous or intermittent type. Many ulcers had completely healed, leaving a hard scar which in process of years had drawn to itself the adjacent areas of gastric wall so as to produce the contraction. Many had unhealed ulcers—some with extensive adhesions to liver, pancreas, and even to the anterior abdominal wall—while others had a fold of great omentum caught up to the lesser curvature, suggestive of old partial perforation.

Surgical intervention is the only possible

means of cure, and there is no condition in surgery that may call for so great a variety of procedures to deal with the degrees and complications met with; and although the radiographic evidence affords valuable help, it is impossible in any given case to have the slightest idea beforehand what surgical maneuver will be resorted to.

In this series the following procedures have been carried out:

When the pouches have been large, with a fairly wide waist between, with much active muscular wall, gastroplasty was chosen in six cases—also in a seventh, but combined with a posterior gastroenterostomy to the distal pouch on account of pyloric cicatrization.

When the pouches were large, the constriction narrow and fibrous, and in several with extensive adhesions to the liver, gastrogastrostomy proved satisfactory in 15 cases.

Posterior gastroenterostony performed in the proximal pouch suggested itself in 14 cases; in two of these the union was made opposite the ulceration but extending well into both pouches, when the proximal sac was small and high up.

Where the pouches were about equal in size and the constriction extensive, with pyloric stenosis in addition, double posterior gastroenterostomy was resorted to in two cases.

In three cases complicated by extensive adhesions in the lesser sac of the peritoneum to the pancreas, a retrocolic anterior gastroenterostomy was possible.

In three of the patients, each having a very small proximal pouch, with the lesser curve adherent to the liver, an anterior gastroenterostomy seemed essential: and in one of these, the intestinal loop being long, an enteroenterostomy was added.

In one very difficult recent case an extensive area at the constriction was adherent to the anterior abdominal wall at the level of the umbilicus, the stomach being much proptosed and acutely kinked, leaving only a small piece of available stomach in the front of the proximal pouch. It seemed inadvisable to separate the stomach from the abdominal wall, it being almost certain that if this were attempted the stomach would be extensively opened and thus increase difficulties and the risk to a patient extremely ill and emaciated. The surgeon was able to mobilize the second part of the duodenum, and perform a gastroduodenostomy between the proximal pouch and the duodenum above the area adherent to the abdominal wall.

In another complicated condition the lesser curve was intimately incorporated with the liver, the proximal pouch small and adherent posteriorly, while the front of the distal sac had hardly any portion not adherent to the liver; pyloric stenosis was present in addition. This looked for the moment an impossible problem to solve; but thanks to a retrocolic anterior gastroenterostomy to the proximal and a posterior gastroenterostomy to the distal pouch, the case was carried safely through.

The last two cases of the series necessitated partial gastrectomy.

In spite of all efforts to improve the condition of the patient before operation, and the care taken on the operating table to avoid shock, seven deaths are to be recorded in this series: three following posterior gastroenterostomy (two women, one man); two following gastrogastrostomy (one three weeks later from pneumonia and empyema); one following retrocolic anterior gastroenterostomy in a male; and one following partial gastrectomy, also in a male.

Three of the patients succumbed to bronchopneumonia in a few days, and one died suddenly from pulmonary embolism on the fourteenth day. One gastrectomy case died suddenly next day, and two others simply from lack of recuperative power.

Ether was administered by the open method in all cases by a skilled anesthetist.

The mortality-rate may appear high; but what mostly impressed the operator was the astonishing recovery in a great many almost hopeless cases, in persons reduced to extreme emaciation through long years of suffering. It is hoped that, in future, much earlier resort will be made to radiographic investigation in vague cases of chronic in-

digestion that do not readily yield to medicinal and dietetic treatment.

With such a variety of operations necessary to deal with this condition, it was interesting to ascertain the end-result to the patient. It does not appear that any particular type of operation had much to do with the final result, provided a free flow had been established from the stomach. Only six have complained of gastric symptoms since operation; one operated upon five years ago has "some vomiting;" one operated upon three years ago complains of "vomiting;" two have some indigestion; one had a severe attack of hematemesis one year after operation, and was subsequently radiographed, but she has now been well for four years. Four have died from diseases unconnected with stomach trouble.

All the others send expressions of thanks and gratitude, and the most frequent answers have been "eat anything," "quite well," "very good health," and one who had suffered severe pain for many years alludes to the operation as "a miracle."

An Estimate of the Value of Local Anesthesia in the Surgery of To-day.

BARTLETT (*Surgery, Gynecology and Obstetrics*, July, 1921) states that a large amount of fluid used in infiltration increases the patient's intake in a definite manner and without causing discomfort. This reasoning was carried to the extent of gradually increasing the amount of fluid while decreasing the percentage of novocaine from one-half to one-sixteenth, by virtue of which he now administers any desired quantity of fluid by hypodermoclysis without inducing any real suffering; in fact, the procedure attracts very little attention in many instances.

It is stated in Braun's epoch-marking work on local anesthesia that the gall-bladder is a forbidden field. It may be worth while to mention in this connection that the writer has repeatedly drained the gall-bladder and removed deeply seated stones without discomfort to the patient, after aspirating the bile and then replacing it with 5-per-cent cocaine for a very brief period. This, of course, after a simple infiltration of the abdominal wall.

Bartlett has injected the anterior sacral nerves with the abdomen open, under ether, for the performance of second operations on the rectum, anus, and external genitalia. He does not believe it is even necessary to strike the nerves with accuracy, as one gets a fair regional anesthesia by merely making a massive injection under the soft tissues covering the hollow of the sacrum, thus causing fluid to suffuse everything in the neighborhood. One saves a large amount of ether while the abdomen is being closed under infiltration and during the period of preparing a second field for operation on the organs mentioned.

The author by way of repetition stresses the plan used so frequently in his clinic of beginning infiltration and ether at the same time, then doing a laparotomy and employing no more ether during the rest of the procedure, except when the patient shows unmistakable signs of needing it under peak load.

It is to be definitely understood that ether by the drop method is the anesthetic of choice in his clinic for major surgery in general, and local anesthesia in some form for minor surgery. But he goes much further than this; hence an attempt has been made in this address to deal with the large number of special considerations which do not fall into either one of the above mentioned classes.

One must always keep in mind that local anesthesia has definite limits which are not to be transgressed; Bartlett has attempted to make many of them clear.

He believes that with increasing experience and better training we shall some day have to establish indications for general anesthesia rather than for local, as is the common experience to-day. It will then seem no more reasonable to anesthetize the entire organism for a strictly local operation on it than it would at the present time to bind or splint the entire body for an injury to an extremity.

Surely no one will advocate the use of local anesthesia to the point of interfering

with the smooth and rapid conduct of a surgical procedure.

It may be safely stated that the anesthetization should never be larger than the operation; for example, one should not under ordinary circumstances attempt a radical breast operation, or any one of the larger abdominal procedures which involve both sides of the midline, under local anesthesia alone.

The operator will have to train himself especially for this work if he expects to be successful in it, although in a busy clinic it is unquestionably the correct plan to have one associate who has this phase of surgery wholly in his hands.

There is a very definite field for the local anesthetist. Such an individual should play a rôle similar to that which is well known in general anesthesia. His services ought to be in demand by the surgeon who makes only an occasional use of these methods, or by one who is not temperamentally suited to the acquirement of them.

Diagnosis and Indications for Operation in Acute Mastoiditis.

MURRAY *(Minnesota Medicine,* July, 1921) observes that a considerable proportion of mastoid involvement does not present at any time the usual signs of mastoiditis. This is more likely to occur in adult cases than in children. During childhood the mastoid cortex is thin and less resistant to pressure from within; infection is transmitted more readily through the cortex, periostitis and subperiosteal abscess are more likely to occur, and the presence of a patent squamomastoid suture, which is likely to be present until the age of two years and sometimes considerably later, serves as a pathway for the transmission of infection from the antrum to the cortex. In adult life, and especially with advanced age, the mastoid cortex becomes hard and resistant, due to osteosclerotic changes which occur, and unless there is free drainage from all the involved cells and antrum into the tympanic cavity and from the tympanic cavity through the membrana tympani, the infection is likely to extend in other directions through the cortex and cause intracranial complications.

On account of the close anatomical relationship between the antrum and the tympanic cavity, it is doubtful if the antrum escapes infection in any severe acute purulent otitis media, and if we consider the antrum as a part of the middle ear, the presence of the classical signs of the mastoiditis such as temperature, pain, tenderness, discharge and external changes over the mastoid bone, do not necessarily indicate a mastoiditis; at least they may not constitute an indication for operation. Such symptoms, including redness and swelling of the soft tissues over the mastoid, may be present early in the course of an acute purulent otitis media, especially in children, before drainage has taken place through the drumhead. Free incision of the membrana tympani, with establishment of drainage, may result in the rapid subsidence of all of these symptoms. Their persistence after drainage has been obtained from the middle ear is of diagnostic importance and becomes an indication for operation.

Temperature varies greatly as a symptom of acute mastoiditis, and when present is usually of low degree, especially in adult cases. In uncomplicated cases of acute mastoiditis in adults, temperature is seldom high and frequently drops to normal on the establishment of free drainage by incision or rupture of the membrana tympani. In children temperature is in general higher than in adults, but extensive involvement of the mastoid may be present without temperature if drainage is free. A recurrence of temperature, with free tympanic drainage, is an important sign of extension of mastoid involvement, and a persistent low temperature, provided drainage is free and no other cause for temperature is present, may be the only apparent indication for operation.

Pain is a very variable symptom, and in uncomplicated cases of acute mastoiditis with free drainage from the mastoid cavities into the tympanum and from the tympanum into the external canal, it is not

likely to be a prominent symptom, and extensive involvement of the mastoid process may be present, without the patient complaining of pain. The continuance of pain, however, after free drainage has been obtained through the drumhead is an indication that the mastoid is involved and that there is not free drainage between the areas of infection in the mastoid and the tympanic cavity, due probably to swelling of the mucous membrane lining the aditus ad antrum or the communication between the antrum and cells, thus blocking drainage. The occurrence of pain on cessation or diminution of discharge from the middle ear is also an indication of mastoid involvement unless the cessation of discharge is due to a sudden closure of the opening in the membrana tympani.

Tenderness is a symptom that is much more commonly present, and is probably the most reliable of all subjective symptoms of acute mastoiditis, as nearly all cases will show some tenderness over some area of the mastoid.

The type of mastoid will influence to a considerable extent the degree of tenderness present. In the pneumatic type with well-developed cells and a comparatively thin cortex, the tenderness may be pronounced, while in mastoids with a thick, hard cortex, tenderness may not be elicited except by very firm pressure, and in some cases it is absent entirely.

The location of the tenderness is of some importance. When located over the antrum or along the posterior portion of the mastoid process, it is more indicative of mastoiditis than when located at the tip.

Recurring tenderness is highly significant of acute mastoiditis. In the early stages of acute otitis media, tenderness of the mastoid may be present and subside in a day or two. If it then recurs and there is tympanic drainage present, operation is indicated if it persists for twenty-four to forty-eight hours, even though there are no other signs present indicating the necessity for opening the mastoid. It should be remembered that it is quite possible to have an extensive mastoid involvement without any sign of tenderness, and absence of tenderness must not be considered an absolute sign that operation is not indicated.

External changes over the mastoid bone, when present, usually furnish positive indications for operation. It sometimes happens, however, that in the early stages of an acute otitis media, before the drumhead ruptures or when the drainage through the membrana tympani is insufficient, external changes may occur, such as redness and edema, due to periostitis. This is especially likely to occur in children, and it often happens that thorough incision of the membrana tympani and the establishment of free drainage will be followed by the rapid subsidence of signs of mastoid involvement.

Changes occur at the inner end of the external auditory canal in a considerable proportion of cases, and when present are a valuable diagnostic sign of mastoid infection. These changes consist of a swelling or sagging of the superior and posterior wall of the canal in close proximity to the membrana tympani and indicate a periostitis which has been extended from the infection in the tympanic cavity or is due to pus which has extended from infected mastoid cells. It is frequently an early sign of acute mastoiditis and is considered an operative indication. The character and duration of the aural discharge is often an important sign of mastoiditis.

A chronic purulent otitis media not only means a chronic mastoiditis with the possibility of complications, but it means the constant presence of a dangerous focus of infection, and it means the certainty of progressive impairment of the function of the middle ear.

Blood examinations are not of much value in uncomplicated mastoiditis. There is generally a moderate leucocytosis. A high polymorphonuclear percentage would indicate the passage of microörganisms into venous circulation and would be suggestive of a sinus complication.

The *x*-ray is of value in mastoid diagnosis and will frequently give us valuable information as to the pathological changes which have occurred within the mastoid process.

During the early stages of an acute mastoiditis, the radiograph will show a cloudiness over the areas of the mastoid cells. This does not constitute an indication for operation, as it may be due to simple congestion of the mucous membrane lining the cells. If the plate shows that the septa between the cells are broken down or if there be shadows indicating the collection of pus in definite areas of the bone, it will indicate the necessity of operation. The radiograph also furnishes valuable information as to the type of mastoid present, location of the lateral and sigmoid sinuses, the presence of xygomatic cells, and it may be the means of diagnosing a perisinus or epidural abscess.

Local Anesthesia for Extensive Abdominal Operations.

FINSTERER (*American Journal of Surgery*, July, 1912) states that local anesthesia is far superior to general narcosis for the mere reason that the contraindications to narcosis which held good heretofore and because thereof to the operation itself, namely, severe affections of the heart and lungs, advanced age and progressive cachexia are of no importance in local anesthesia, so that we can still operate upon patients for whom every physician must decline an operation under general narcosis. This means that with the systematic improvement of local anesthesia its field of usefulness can be greatly enlarged.

In order to bring about complete painlessness in abdominal operations it is absolutely necessary to follow the technique of local anesthesia exactly. On the basis of an experience in more than fifteen hundred laparotomies as performed by him under local anesthesia, Finsterer confirms the statements made in regard to similar operations by Lennander, Kappis, and others. The opening and suturing of the peritoneum of the anterior abdominal wall is the most painful part of the operation. It is therefore absolutely necessary to avoid this pain, and this can be achieved, as for example in laparotomy of the upper abdominal region, by making the abdominal walls insensible to pain with fan-shaped injections of a half-per-cent solution of novocaine on the outer margin of the rectus. The infiltration of the section surface alone does not suffice, because the pressure of the abdominal spatula on the lateral portion of the already sensitive peritoneum causes pain. In all laparotomies, therefore, the conducting nerves must be blocked at least a hand's breadth centrally from the incision by an exact conducting anesthesia.

The touching and squeezing of stomach and intestines are painless if pulling of the mesentery is avoided. The mesentery itself contains pain-conducting nerves, therefore this also must be blocked by novocaine.

In order to carry out a stomach reaction actually without pain we must, besides an exact conducting anesthesia of the abdominal walls, inject a novocaine solution of thirty to forty cubic centimeters at the base of the small omentum into the ligamentum hepatoduodenale, at the base of the mesocolon transversum, in the peritoneal transit from the pancreas. For a resection of the small intestines the injection is made at the base of the mesentery. As the stomach, the small intestines and the gall-bladder are supplied by the nervi splanchnici, these can be made insensible by an injection of seventy to one hundred cubic centimeters of a one-half-per-cent novocaine solution on the anterior surface of the twelfth thoracic vertebra (splanchnicus anesthesia according to Braun). By an exact conducting anesthesia, stomach resections may be performed absolutely without pain and without the slightest help of ether.

In the urgent operations for intestinal obstruction or peritonitis, the indications for local anesthesia may be considerably enlarged. As in such affections a paralysis of the vasomotor nerve is present, and consequently a diminution of blood-pressure, we must avoid any further decrease of the blood-pressure ending in a collapse. Therefore we may employ neither chloroform nor a deep ether narcosis, as these would de-

crease the blood-pressure. But in these affections the central application of novocaine in the form of lumbar anesthesia or of paravertebral conducting anesthesia is contraindicated, as either may lead to diminution of the blood-pressure and therewith to collapse. An exact conducting anesthesia of the abdominal walls for the opening of the abdomen, combined with a short ether narcosis for the purpose of finding the cause of the intestinal occlusion, answers well. The blood-pressure is not diminished thereby, but, on the contrary, the ether narcosis raises the blood-pressure which is diminished by the eventration of the intestinal loops.

The use of local anesthesia favorably influences the postoperative course also. The cases of death of so-called operation shock, which is to be interpreted only as protracted narcosis effect, can be entirely avoided, and the postoperative stomach and intestinal atonies with secondary stomach dilatation and peritonitis are almost wholly missing. Hackenbruch and Reinhard have also confirmed the fact that the postoperative course even after the severest operation is quite unusually good. By local anesthesia the fatal lung complications are also almost entirely avoided.

Ringworm of the Nails.

Hodges (*Archives of Dermatology and Syphilology*, July, 1921) contributes a careful study to this subject, beautifully illustrated, describing in full the various culture methods. He offers this contribution largely as the result of being a victim of this affection for about thirty-five years. A final demonstration of its true nature and successful treatment has stimulated the author to an intensive study of this subject.

Sixteen cases of this disease, termed onychomycosis, are embraced in the report. The presence of a fungus of the trichophyton type has been established in every case by a microscopic examination of the nail paring.

The author states that the majority of these cases were found in a small city of 12,000 inhabitants, several being acquaintances, indicating a prevalence considerably greater than reported by Foster of one to 5000 among immigrants at Ellis Island. Exact statistics are not available, but the inclusion of several cases not embraced in this report, but observed by local physicians, would indicate a ratio of at least one case to each 500 of population—a prevalence ten times greater than reported by Foster among foreign immigrants. These cases to a certain extent represent a special class, among them being included a physician, a lawyer, and a professor, American-born people who bestow more than ordinary care on personal cleanliness.

No cases were found due to favus or trichophytons of species apparently seldom responsible for scalp ringworm, but specifically inclined to attack the nails.

With one exception, all the patients were men. The affection always began at the free margin of the nail and slowly undermined the nail plate until it became so loosened that it was either shed or removed by trimming. Subsequent growth showed a thickened nail of worm-eaten appearance, more or less irregular and of a dirty yellowish color, the outgrowing diseased nail plate often being shed at intervals of a few months. No member of the family or associates were affected with ringworm of the scalp.

As to treatment the author, who is a chemist, speaks with some diffidence. He says for thirty-five years the patient in Case 1—the true nature of whose disease had not been recognized—had been treated with various applications with little improvement, except to allay somewhat from time to time the severity of the eruption on the hands and feet. Following a demonstration of its true nature, several forms of treatment were tried, among them soaking the nails in a solution of mercuric chloride followed by application of ammoniated mercury ointment. No improvement of the nails was noted after about two months of such treatment. Roentgen-ray treatment was not tried in this case, but in

two other cases of this series a few exposures had been given without apparent improvement.

A trial of Whitfield's ointment—benzoic acid 4 parts, salicylic acid 2 parts, petrolatum 30 parts—was prompted by the success reported by Ormsby and Mitchell attending its use in treatment of ringworm of the hands and feet. The immediate effects of this ointment after a few days' use were so pronounced and favorable on the skin eruption that attention was directed to the nails. In order to reach the fungus, it was found necessary to scrape the nails repeatedly after applying a solution of potassium hydroxide of about 10-per-cent strength. Whitfield's ointment was applied at night, being held in place on each nail with a small piece of cloth and narrow strips of adhesive cloth. Whatever adhesive matter from the cloth remained was easily removed the next morning with a cloth and a little gasoline. Treatment, although productive of some inflammation, interfered in no way with daily duties. If irritation became too severe, use of the ointment was discontinued for a few days or else it was diluted considerably with petrolatum. Successful destruction of the fungus was in several instances accompanied by some pus formation under the diseased nail bed. Partially invaded nails gave more trouble than when the entire nail was involved, for in spite of close trimming the fungus would apparently always have invaded some place a little farther back under the nail plate than could be reached by the ointment, and it was only after trimming well back of the infected portion that success was attained.

Owing to the possibility of keeping the ointment more constantly in contact with the toe-nails, it was not found necessary to use the potash solution, as the application of the ointment softened the nail sufficiently for the removal of the affected part by close trimming.

With this persistent treatment improvement was soon noted, and within four months the finger-nails had attained their normal growth. The toe-nails required a somewhat longer time to grow out. There has been no reinfection of the finger-nails after a lapse of two years, but two of the toe-nails after several months showed some reinfection requiring further treatment.

Correspondence

Lost and Found Radium.

To the Editors of the THERAPEUTIC GAZETTE.

SIRS: You might like to publish this account of the temporary loss of a valuable tube of radium, which occurred under the eye of my friend Dr. Thurstan Holland of Liverpool, one of the leading *x*-ray experts in the kingdom. We had a similar accident in my own hospital about five years ago, when we were treating a patient with some twenty-five tubes applied over a large rodent ulcer of the face. Soon after their removal it was noticed that there were only twenty-four tubes in the package. Suffice it to say that after an anxious hunt all over the hospital it was concluded that the tube had been carried off in the city ash-cart, and dumped into the vast heap on the outskirts of Baltimore. A sad little party journeyed out to the dump with an electroscope and began working somewhat vaguely over the vast area, with no result, until at last a faint response came in the slow dropping of the leaf of the instrument. A little further search brought to light some envelopes addressed to patients in the hospital. Then the hunt was gradually narrowed down by the electroscope until one area seemed quite responsive. This material was lifted into a discarded bath-tub, and was found quite active, the first bucketful of the waste responding vigorously; again, the

very first handful taken from this, too, showed increased activity, and here the radium was found! We felt like the woman in the Bible who rejoiced so over finding her lost coin, and we could scarcely restrain ourselves also from calling in our neighbors to rejoice with us.

The following account is in Thurstan Holland's own language:

"At the Liverpool Royal Infirmary, in February, 1914, a platinum tube containing 50 mgs. of radium was lost. At the time it was lost the radium—bought at £16 per milligramme—was worth £20 per milligramme, *i.e.*, £1000.

"The tubes had been fixed over a rodent ulcer on the face of a man in one of the wards. The next day on removing the dressings one of the tubes was missing. The man during the night had been allowed to go to the lavatory, and this rather complicated matters. When the loss was discovered the ward had been swept out, and all the refuse had been thrown into an ash-cart, which was full and on the point of being removed.

"Mr. Moor stopped the removal of the cart, and suggested that Professor Wilberforce—the Professor of Physics at the University—should be asked to come over and bring an electroscope to help find the radium.

"The patient, his bed, and all likely places in the ward were tested, with a negative result. The electroscope was then taken down to the court and placed on the edge of the ash-cart, when it slowly reacted, the leaves falling together. It seemed pretty clear from this that the radium must be in the ashes.

"Bucketfuls of ashes were then removed from the cart, and each one was tested until one of them discharged the electroscope. Handful by handful the contents of this bucket were removed until the remainder in the bucket gave no reaction. In the last handful taken out the tube was found.

"C. THURSTAN HOLLAND."

All such experiences, and they have been many in our country, only go to show how much better it is to employ the emanation in our treatments. The loss of the emanation is equivalent to spilling a bucket of milk; the cow still remains to furnish more milk.

The Liverpool Workhouse Infirmary mentioned above, where Dr. Holland lost his radium, is the institution where Agnes Jones (1832-1868) laid down her life in the first introduction of trained nursing into a large pauper community, even worse than Philadelphia's old Blockley in its early evil days. Its 1300 inhabitants included the very off-scourings of a degenerate civilization, and was the place where the reeking wreckage of the alleys and the closes crept to die. To keep down fighting a policeman went through the wards every night. Here Mr. W. Rathbone, Liverpool's great philanthropist, in coöperation with Florence Nightingale, opened up a new field of philanthropic endeavor, and secured Agnes Jones, Florence Nightingale's favorite pupil, for the service to which she gave her devoted life. With a full knowledge of the fact that many noble women have since made great sacrifices in similar service, the question may yet well be raised whether any one has ever succeeded in coming up to the standard set by noble Agnes Jones, the pioneer.

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